

INEXPENSIVE
RURAL COTTAGES
AND
BUILDINGS FOR SMALL HOLDINGS

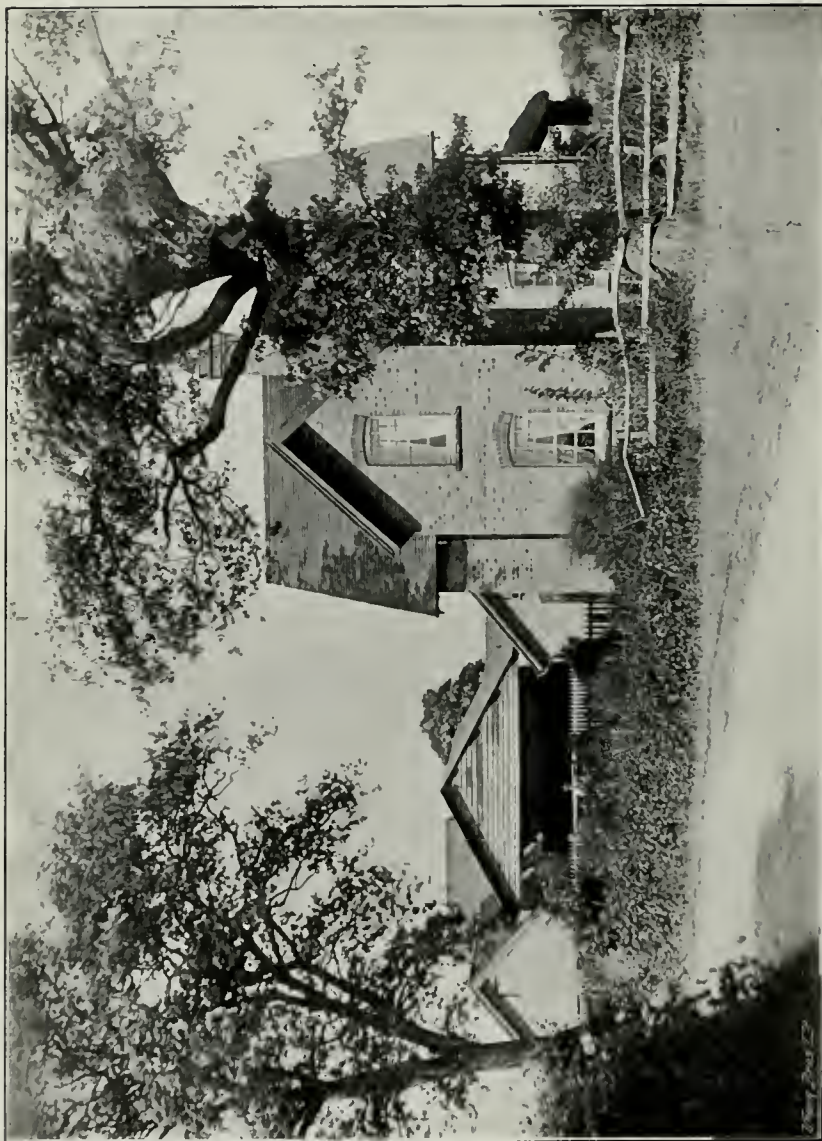
SAMUEL TAYLOR, F.S.I.



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INEXPENSIVE RURAL COTTAGES
AND BUILDINGS FOR SMALL HOLDINGS



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COTTAGE AND BUILDINGS FOR A SMALL HOLDING.

DESIGNED BY THE AUTHOR AND ERECTED IN 1900.

INEXPENSIVE RURAL COTTAGES

AND

BUILDINGS FOR SMALL HOLDINGS

BY

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PREFACE

THAT better rural cottages and increased numbers of small holdings are desirable in the interests of rural workers is now generally admitted, and one may go further and say that they are desirable in the interests of landed proprietors, the larger farmers, and of the country generally; but the successful provision of improved cottages and extension of small holdings depends almost entirely upon the necessary and efficient buildings being provided at a cost on which the owners may secure a reasonable rate of interest, that rate of interest admitting of a fair and reasonable rent being charged the tenants.

With a view of showing how this result can best be attained, I have prepared a series of plans and estimates of cost of *inexpensive* cottages and of buildings for small holdings with explanatory chapters thereon, the whole being based on half a century's intimate connection with rural life, a large portion of which period has been occupied in the management of rural properties, and in designing and restoring all classes of buildings incidental thereto—a fact which may possibly be taken as some assurance that the book will be devoted to the practicable side of the subject, and in consequence I do not give any designs of luxurious buildings, such as no owner would think of erecting without the assistance of an experienced architect; but instead, those that I do give are of buildings unpretentious in appearance, inexpensive to erect and maintain, and adapted to meet the requirements of a large proportion of the country, and such as may be of some service to owners or those having charge of rural properties, including estate clerks of works, rural builders, and all others who take an interest in rural housing, small holdings, and depopulation questions.

THE AUTHOR.

NUTTALL, NOTTS, *September*, 1906.

CHAPTER I

THE ESSENTIAL FEATURES OF A WORKING MAN'S COTTAGE AND THE RATE OF INTEREST IT WILL RETURN ON OUTLAY OF CAPITAL

BEFORE discussing the accommodation which a labourer's or workman's cottage should afford, it will be well to briefly consider the class of persons to be accommodated, their means and their usual habits and mode of living; we shall then be the better able to decide what things are essentials and necessaries, and what may be looked upon as being in the nature of luxuries.

Broadly speaking, labourers and workmen may be divided into two classes, viz. :—

- (i.) Farm and other day labourers earning from 15s. to 24s. per week, according to the part of the country where they are employed.
- (ii.) Workmen, artisans, and others, earning from 25s. to 35s., and in some cases up to 40s. per week.

Beginning with the first of these classes as being that of men with the least requirements and the smallest means, we may assume that the family of a man of this class is on the average composed of husband and wife with from two to six children, and we have then the probable approximate number requiring accommodation, and in order to ascertain what the latter should be it is necessary to inquire into the habits and mode of living of the members of such a family.

First of all the man will spend a good deal of his time outside the cottage during at least six days in the week; the children from five to thirteen years of age—at which latter age they will probably leave home—will be at school or on the road during the greater portion of five days in the week; whilst the wife and babies will be practically[†] in or about the house entirely.

From this it will be seen that one great necessity is sleeping accommodation, and if the family consist of husband, wife, and one boy and a girl (over four or five years of age) only, *there must be three bedrooms*, as there are already more than enough cottages to accommodate the few with less families.

Another necessity is a room where the cooking and other house-work may be done, and which may also serve as a *general living room*.

A third necessity is a scullery to be used for washing of utensils, clothes, &c., and to serve as a bath-room for the children as well as a general lavatory for the household.

There must also be some provision for storing food and other articles necessary for household use.

Having ascertained the minimum requirements of the labourer's cottage a further important consideration is the arrangement of the various parts to meet these requirements in a manner suited to the means, &c., of the occupier of the cottage, bearing in mind that in few workmen's households can any outside help be paid for, and in that of labourers' absolutely none; hence the wife has almost single-handed, in health and often in sickness, to be housemaid, cook, washerwoman, and general repairer of clothes, in addition to which, during a considerable period of her married life, she must be mother and nurse.

From this it will be seen that the cottage should be compact and convenient, and in this connection I may say that I cannot conceive a more inhuman system of planning than that which places the scullery or washhouse *outside the house at some distance from it*, rendering it useless for the purposes for which it is most needed and turning it into a death-trap for the wife on wash-days in the winter, besides making it necessary to leave children, perhaps very young ones, alone in the house with the danger that they may set themselves or the house on fire or otherwise injure one another.

It has been said that labourers demand—and rightly demand—a *parlour* in addition to the foregoing accommodation. Now I may say that I have as agent, surveyor, or as valuer for rating and other purposes during the last forty years inspected the insides (as well as the outsides) of some thousands of working men's houses, and am as a result well acquainted with their habits and requirements, and I most emphatically say that the labourers of this country make no such demand as that attributed to them. They are much too modest in their requirements to demand a thing which would be practically useless to them, and for which they cannot afford to pay one penny-piece in the shape of rent. A labourer earning £1 a week or less can scarcely afford to keep one fire going, and a parlour without a fire is useless seven or eight months in the year; and when the room would be usable without a fire the labourer and most of his family would spend the greater part of their time out-of-doors or in bed. Hence to an ordinary labourer a parlour is neither a necessity nor a luxury, and it is only perhaps when he has improved his position by becoming a small holder, and is fortunate enough to have a wife above the average that a parlour can be of any service to him whatever.

We may say, then, that the minimum requirements of a labourer's cottage of the lowest grade are—living room, scullery, larder and store on the ground floor, and three bedrooms on the first floor. But merely to state this and nothing more is to only half deal with the subject; these various rooms should be arranged *inter se* in the most convenient manner, and should each of them possess certain essential characteristics or features in order to render them fit to live in and suitable for the class of people using them. I therefore give below what a fairly long experience has taught me are the features most essential and most generally appreciated by the occupants of a cottage suitable for the class of labourer first mentioned, viz., those earning from 15s. to 24s. per week.

There should be—

(a) An external door opening into an *inner lobby*, which latter should afford *direct access* to each of the rooms on the ground floor and also to the stairs *without the necessity of passing through one room to reach another*.

(b) A comfortable living-room, containing not less than 140 to 160 superficial feet of floor space, clear of all projections such as cupboards, fireplaces, &c., and be well lighted—and by well lighted I mean having windows of an area equal to at least one-seventh of that of the floor space and placed so as to secure a maximum of direct sun's rays; the room should not be less than 8 feet high, and preferably 8 feet 3 inches to 8 feet 6 inches high, and should have *one door only* opening into it (save a store cupboard door), and be fitted with a fire-grate suitable for cooking and heating water.

(c) A scullery of not less than 50 to 70 superficial feet in area, fitted with a small glazed stoneware sink and a copper, the latter with a flue so constructed as to carry away the steam; the scullery should not open directly into the living room, but should communicate with the inner lobby; if a second external door is necessary it should be in the scullery, and there should be a small window in the wall between the scullery and the living room.

(d) A small cupboard or store for dry goods and articles in constant use placed in a convenient position in relation to the living room.

(e) A small larder for perishable food, *well away from fires*, having one wall at least, *an external one*, in which a small window can be placed for affording light and ventilation, and having a door opening into the inner lobby.

(f) Convenient stairs, commencing from the *inner lobby* and landing at a point from which direct but separate access may be obtained to all bedrooms, and having on one side *an external wall*, in which a window may be fixed.

(g) Three bedrooms, containing in the aggregate as a minimum 1,800 cubic feet of air space in the smallest cottage; the rooms should vary a little in size, but not to such an extent as to render the smallest room useless; two rooms

should have fire-grates, and all should be well lighted and ventilated with windows opening at the top. The internal arrangement should be such that there is in each bedroom a convenient place for a bed, which should not be placed up to an external wall nor obstruct the access to the windows.

(h) A small fuel store, incorporated in the cottage block for the sake of convenience, and more particularly to secure a little additional area for the bedrooms, particularly in the smallest cottages; the place should be large enough for storing a load of coals and a little firewood, the upper part being useful as a tool store.

The accommodation required in a cottage for a workman of the second class, viz., one earning from 25s. to 35s. per week is practically the same as that mentioned above, with the addition of a small parlour on the ground floor, which addition by rearrangement can be utilised for enlarging the bedrooms to an aggregate of 3,000 cubic feet of air space.

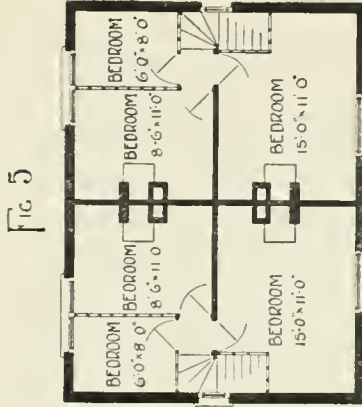
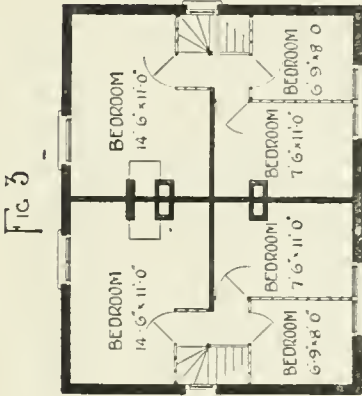
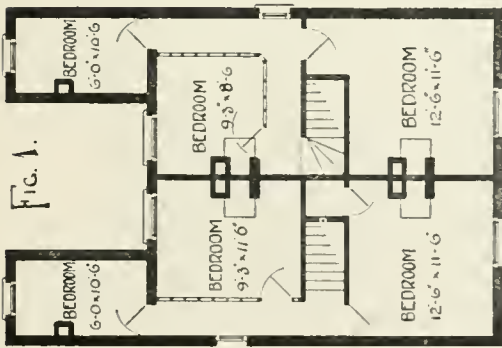
The parlour for a working man's house need not, and seldom should, have an area greater than 75 per cent. of that of the living room; those working men who occupy cottages with parlours may be divided into two classes—the thriftless, who make lumber-rooms of them, and the better class of working men who decorate and furnish their parlours and then *shut them up*, and seldom allow any one to use them: hence a parlour as large, or nearly as large as the living room is mostly so much waste; a living room with 150 to 160 feet of floor space to a parlour having 120 feet is a good proportion.

Now, one may ask, are the features I have shortly sketched above as a general rule to be found in labourers' or other workmen's cottages, modern or ancient? With respect to the older cottages, as the Report of the Royal Commission, which sat in 1882-83 to inquire into the condition of the agricultural labourer in England and Wales, shows a large proportion of them *were hovels only fit for pigs to live in*, and it is to be feared that the same condition of things still obtains in many parts of the country; and as regards the newer cottages, a great many of these do not fulfil the essential conditions I have laid down.

They possess living rooms—or what pass as such—badly lighted, possibly with a door opening directly into the external air as well as *two or three other doors* in them communicating directly with the sculleries, larders, or stairs, thus rendering the principal room in the house draughty and both inconvenient and very uncomfortable.

The sculleries are generally too small for the rougher work to be done in them, or are so placed that to use them the occupants of the cottages must go into the open air, or if in them, in order to reach other parts of the houses must first pass through the living rooms. The larders, if there are any, open

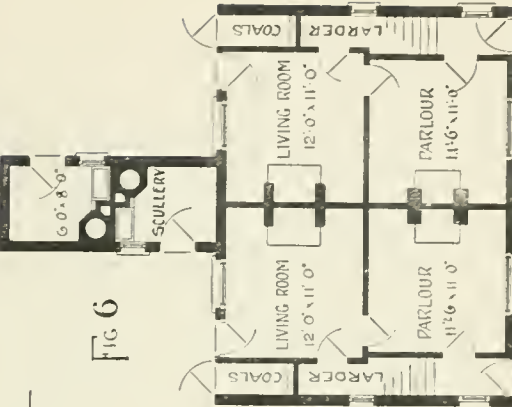
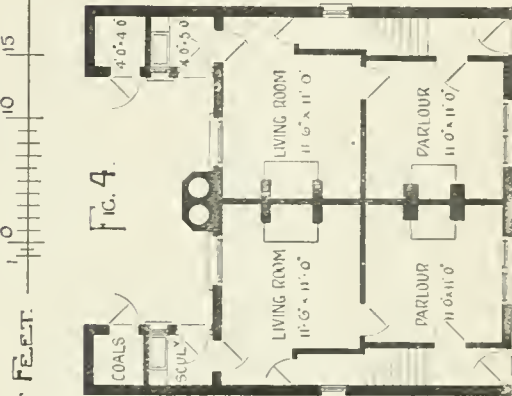
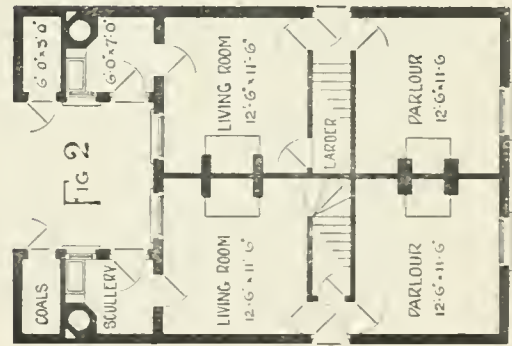
COMMON TYPES OF WORKMEN'S COTTAGES BUILT IN RURAL DISTRICTS



CHAMBER-PLAN

CHAMBER-PLAN

CHAMBER-PLAN



GROUND-FLOOR-PLAN

GROUND-FLOOR-PLAN

GROUND-FLOOR-PLAN

directly into the living rooms, or the sculleries, or are placed in the centre of the cottages, where they are completely cut off from the proper means of ventilation and light, or are sometimes in close proximity to the living-room fireplace.

The stairs generally commence in the living rooms and land at inconvenient points, so that space on the first floor must be sacrificed for passages or render passage bedrooms a necessity; and in addition are sometimes placed in the centres of the houses, where they cannot be properly lighted or ventilated.

That these defects are by no means exaggerated will be apparent from an inspection of the plans illustrated on Plate I., which are plans of common types of working men's dwellings built, I might say, all the country over, and which the reader will see exhibit the defects I have just enumerated in a more or less marked degree.

Figs. 1 and 2 are plans of a type frequently built for artisans or workmen receiving high wages. They contain a large cubic space—20,286 feet—and taken at 5d. per cubic foot, the lowest price for which they could be substantially built, they would cost £422 12s. 6d., and with privies and ashpit, £445.

Figs. 3 and 4 show another arrangement. These cottages are smaller than the previous ones, containing 15,826 cubic feet, which at 5d. works out at £329 14s. 2d., or including privies and ashpit at £352.

Figs. 5 and 6 are plans of another pair of such cottages, containing 16,917 cubic feet, giving a total cost at 5d. of £352 8s. 9d., or with privies and ashpit, £375.

On examination it will be found that each of these plans possesses some one or all of the defects to be specially avoided. All the *living rooms* communicate directly with most of the other rooms, and have two or more doors opening into them, whilst that in Fig. 6 has one opening directly into the external air. All three are small, having only 134, 117, and 122 superficial feet of *clear floor space*, respectively, and have but a small area which can comfortably be used as a sitting space.

In Fig. 4 the scullery is so small that the copper has to be placed outside in the open, whilst in Fig. 6 the sculleries are built on at the rear, one behind the other; consequently, any member of the household desiring to use them must first cross an open yard—an arrangement strongly condemned by all who have to live in such houses.

In all of them (except in the left-hand house of Fig. 2) the larders open directly into the living rooms, and in Fig. 2 open as near the cooking range as it is possible to do so, and in the latter case, being also at the centre of the houses, cannot be properly ventilated—a condition of things very detrimental to food which may be kept in the larders.

The parlours in each case are nearly as large as the living rooms; they would be ample if 10 per cent. less in size, and that amount added to the living rooms would vastly improve the latter.

The bedrooms, as a whole, are fairly good, though in the case of Fig. 2 the bedrooms over the living rooms have to be spoilt in order to make a passage, or they must be passage rooms themselves.

Altogether, the three pairs are badly arranged, *wasteful and costly* in proportion to the useful accommodation they provide, and in the case of Figs. 1 and 2, unless the living-room windows faced nearly due south very little sun's rays would penetrate these rooms, and even if due south the rooms could only receive the rays for a very short time in any one day, as they would be shut off by the projecting sculleries, except when the sun is directly opposite the windows.

It may occur to some of my readers to inquire how it comes about that cottages embodying so many defects are designed and built on such a large scale. The only explanation is that the majority of them are not designed at all; they are simply bad copies of indifferent originals, the popular belief being that cottages are such very simple buildings, *they need no designing*, whereas it requires a fairly long experience in the application of the principles of design before one arrives at any satisfactory results in the shape of cottages with a *maximum of compactness and convenience at a minimum of cost*.

In some cases the defects arise from the builder aiming at the production of a "villa" externally, instead of a cottage for a working man: and in this connection I might say that what is still more surprising, even in the case of the published plans of the cottages built for the recent exhibition at Letchworth, 90 per cent. of them possess more or less the defects of Figs. 2, 4, and 6.

Having pointed out the essential features of the cottages for various classes of rural workers, also the defects in many of the present-day cottages, the question arises, *Can convenient, substantial, and healthy dwellings be provided at a cost which will allow of a reasonable return on the outlay, without involving the tenants in excessive rents?*

In the first place we have to determine what is a reasonable rate of interest on the outlay, and we can only do this by a comparison with the rate of interest derivable from other investments of the same class of security: these are first, Consols, returning about $2\frac{3}{4}$ per cent. on the present purchase price, and the leading English railway stocks, which in the aggregate yield a little over 3 per cent.; of course there are other investments, debentures for example, offering a higher rate of interest, but they cannot be classed with real property; and although we sometimes hear of the nationalisation of railways and of the land, we never hear of the nationalisation of house property, for the simple reason

that there are already too many owners of houses for the suggestion to be entertained, hence we may consider investment in rural house property perfectly safe, equal in that respect to Consols; and taken on a purely commercial basis a clear return of 3 per cent. is a fair basis to start from. To this net return must be added the letting value of the land forming the site of the cottages, the cost of periodical repairs and painting, insurance, management, and a sinking fund to replace the capital outlay at the end of the life of the cottages, and as a specimen case for determining these figures I will take the pair of cottages illustrated on Plate V., which require a total outlay of £341 6s. 4d.

| | £ | s. | d. |
|---|------------|-----------|----------|
| 3 per cent. on £341 is | 10 | 4 | 10 |
| 1,400 square yards of land (600 yards for each cottage, clear of buildings, road, &c.), at £1 15s. per acre | 0 | 10 | 0 |
| Insurance | 0 | 4 | 6 |
| Management | 0 | 17 | 6 |
| Periodical Repairs and Painting | 1 | 5 | 0 |
| Sinking Fund at 3 per cent. to repay £341 in 100 years | 0 | 11 | 2 |
| Total Annual Charge | <u>£13</u> | <u>13</u> | <u>0</u> |

or practically 4 per cent. on the £341 6s. 4d., 1 per cent. of which covers rent of land, and all outgoings; and as there are many random statements as to the various items forming the latter it will be necessary to shortly discuss them.

In the first place there is the rent of the land. Now I am dealing with the case of landowners who wish to build cottages to meet the requirements of their estates and not with speculators, and in all such cases as the former 35s. per acre for the land and fences on it is a fair rent, assuming that the land occupied by the cottages would generally be the most valuable from a letting point of view.

The items for insurance and management do not, I think, require any comment.

Repairs and painting. I have had all classes of rural buildings, of all ages, from quite new ones to others upwards of 200 years old, under my constant supervision, for periods sufficiently long to enable me to form a fairly accurate opinion of their length of life and cost of upkeep, and taking the cottages previously mentioned, costing £341 6s. 4d., 25s. per annum would be ample to keep them in a good state of repair for 100 years.

The most economical way to keep such buildings in repair (and incidentally most other buildings as well) is to inspect them periodically, painting the

outsides thoroughly every four years, at the same time doing all necessary little repairs; the painting, if done thoroughly well, will cost £2 every four years, leaving £3 for repairs; but in the first 25 years, if the buildings were in the first place substantially built according to the rules of sound construction, the cost of repairs ought not to amount to more than £5, so that at the end of that period there would be an accumulated fund of probably £15 for future repairs.

During the next 25 years the annual allowance of 15s., or £18 15s. in the aggregate (the cost of painting remaining the same) would keep them in good repair, whilst the balance of £15 from the first period would, with 3 per cent. compound interest, amount to £31 4s., and in the third period more substantial repairs would be required absorbing the allowance of 15s. per annum, and some portion of the accumulated fund of £31 4s., the fourth period of 25 years absorbing the remainder; and at the end of the 100 years the cottages *would not be worn out* if the £125 set apart for repairs and painting had been properly spent; it is the long intervals of neglect of small repairs and painting which in the end renders them so expensive and at the same time shortening the lives of the buildings, involving results very much like going to a moneylender and borrowing money at 200 per cent. interest, or, in other words, expending a capital sum twice over and having nothing at the end.

As regards the sinking fund, an annual charge of 11s. 2d. at 3 per cent. compound interest will provide £341 at the end of 100 years.

Cottages well built and periodically repaired and painted as allowed for, will not be worn out at the end of 100 years, and although money cannot be borrowed for so long a term the point does not affect the calculation; I have taken that period, as a longer one would scarcely affect the annual charge, and it is manifestly unfair that money should be borrowed and the loan and interest be paid off in 40 or 50 years, and then say that the total annual charge of interest and repayment of the capital as well as all other outgoings should be the rent to be charged the tenant, as it will at once be seen that in that case the tenant has, at the end of the period (40 or 50 years) paid in rent the whole capital value of the building, whilst there still remains a substantial part, probably 50 per cent. of the original cost, for the owner; and a calculation such as this can only be made on the basis of an owner having money to invest in the ordinary way, and not having to borrow under the various land improvement acts.

There is, however, another side to the question of rural housing and small holdings other than that of an apparent substantial rate of interest on the property, viz., the *prosperity and comfort* of all those connected with the cultivation

of the land—matters recognised by some owners and to which it is highly desirable all those who do not at present do so should pay attention.

In conclusion, then, we see that a gross return in the shape of rent of 4 per cent. on the outlay on the buildings produces a net return of 3 per cent. equal in that respect to both Consols and railway stock, and therefore forms a fair basis to work upon, and I have prepared a table, given at the end of the text, showing the rents for the cottages and for the buildings based upon calculations worked out as the example given above.

There may, of course, be some landowners, who may say that a clear return of 3 per cent. is not sufficient. In such cases it is an easy matter to add $\frac{1}{4}$ to $\frac{1}{2}$ per cent. on the outlay, as the case may be, to the rentals; but I may say that there are a great many, some of whom I have had the honour to serve, who are satisfied with a clear return of $2\frac{1}{2}$ per cent. on their outlay.

CHAPTER II

DESCRIPTION OF THE COTTAGES ILLUSTRATED ON PLATES II. TO XI.

BELOW I give a short description of each of the cottages and their offices illustrated by Plates II. to XI. I have not gone into detail, as the drawings, being accurately to scale and having all the necessary dimensions figured on them, will furnish all further information required, my chief object being to point out how each cottage fulfils the essential requirements mentioned in the last chapter.

To avoid unnecessary repetition, the schedule of prices referred to in this chapter is the one given at the end of the book in the bill of quantities for the cottages on Plate V., and the table of rents referred to is given on page 61. The cost of the various cottages are based on the schedule of prices, and have been obtained by *accurate bills of quantities in each case*, and are for the buildings (including privies) complete, ready for occupation, but do not include water supply.

Plate II.

Figs. 7–12 show plans, elevations, and section of a pair of cottages suitable for labourers and for any aspect except due north. They are very economical in construction, compact, and conveniently arranged, and such as a great majority of labourers would be delighted to occupy ; the total cost works out at £308 19s. 4d.

The external appearance of the cottages is unpretentious, with the advantage that the houses look like what they are intended to be, and as a result fit in well with the countryside.

The entrance in each house is at the end, opening into an inner lobby, which latter gives direct and independent access to every part of the cottage, the stairs to the bedrooms starting from it.

The accommodation comprises a good and convenient living room, having 140 feet supt. of floor space, and a recess forming a store for dry goods and

articles in constant use placed in a convenient position; a scullery containing 60 superficial feet of floor and fitted with a copper and glazed sink; a single sheet of glass inserted in the wall between the scullery and the living room enables the wife, when engaged in the former, to see what is going on in the latter without the necessity of leaving the scullery. There is a fuel store near at hand, incorporated in the block, and a larder well away from all fires, opening into the lobby. Of bedrooms there are three, containing over 1,900 cubic feet in the aggregate, and two having fireplaces, all three being conveniently arranged for the placing of a bed.

As shown by the Schedule of Rents, the very modest rent of £6 3s. 7d. per cottage per annum produces a gross return of 4 per cent. on the outlay.

Plate III.

Figs. 13-18 give the same particulars for another pair of labourers' cottages, having precisely the same accommodation as those on Plate II., the rooms on the ground floor being rearranged to render the cottages suitable for any aspect, even that of north. The windows in the living room as now shown are suited to a south, south-east, or south-west aspect, but by reducing them and inserting others at W, the arrangement will then be suited to a northerly aspect. The only disadvantage of the arrangement of these cottages, as compared with those on Plate II., is that the living-room fireplaces are on an external wall—an arrangement to be avoided if possible; but if the site is such that direct sun's rays cannot penetrate the living room save by such a disposition of the fireplace, then such an arrangement is justifiable, *for it is safe to say that a living room so situated as to receive little or no direct sun's rays is not fit for human habitation.* The same remarks apply to bedroom fireplaces but not to the coppers, the flues from which may be built in any convenient position. The total cost of this pair amounts to £307 19s.—about £1 less than the previous pair.

Plate IV.

Figs. 19-24 are plans, elevations, and section of a pair of labourers' cottages, suited to any aspect except due north. The internal arrangements are practically the same as shown on Plate II., but the rooms are larger throughout, the living room having an area of 150 feet superficial, and the three bedrooms contain nearly 2,000 cubic feet of air space.

These make excellent cottages, such as but few labourers enjoy. They contain 13,512 cubic feet, and, the cost working out at £303 8s. 3d., gives the cost per cubic foot as 5·38d.; with the privies added, the total cost ready for occupation is £326 1s. 2d., and to produce a gross return of 4 per cent. on this

sum requires an annual rent of £6 10s. 5d., or 2s. 6d. per week for each cottage.

Plate V.

Figs. 25-30. Here are shown plans, &c., for a still larger pair of cottages for labourers or other workmen, arranged with one external door only, opening into a good lobby giving direct and separate convenient access to the living room, scullery, larder, stairs, and bedrooms. There is a good and convenient living room with nearly 150 superficial feet of clear floor space, and a scullery containing about 70 feet superficial, fitted with copper and sink, and if desired a small fireplace could be built in it. There is a dry store under the stairs, a good larder, and a fuel store and three good separate bedrooms, two with fireplaces, and all three in the aggregate containing 2,275 cubic feet.

On page 63 is given the bill of quantities for the work in *these* cottages, and there priced out the cost amounts to £318 13s. 5d., and as they contain 14,757 cubic feet, this works out at 5·18d. per foot cube, and adding the cost of the privies the total comes to £341 6s. 4d., the annual rent on which must be £6 16s. 8d. per cottage, or only 2s. 7½d. per week, to produce a gross return of 4 per cent. per annum.

The cottages as drawn are suitable for a south to west or east aspect, but by contracting the front windows in the living rooms and inserting additional ones at W they may be made to suit all points of the compass—an important feature.

Plate VI.

Figs. 31-36. Here are illustrated a superior pair of cottages quite good enough for any class of rural workmen above that of a labourer, and suited to any aspect except due south; if placed fronting due south, the living-room windows would face due north—a most undesirable position—but in any other position they would receive a fair amount of sun's rays as there are no projections from the main block large enough to shut out the sunlight.

As before, there is a good entrance lobby giving independent access to the rest of the house, good and convenient living room, containing over 150 superficial feet clear floor space, scullery having nearly 70 feet, larder opening into the lobby, convenient dry store, a parlour, and three excellent bedrooms, the latter containing 2,900 cubic feet of air space.

The cost, exclusive of privies, is £381 4s. 6d., which works out at 4·88d. per foot cube, and adding privies, the total cost is £403 17s. 5d. To produce a gross return of 4 per cent. per annum on the outlay an annual rent of £8 1s. 7d., or of 3s. 1½d. per week, would be required from each cottage.

Plate VII.

Figs. 37-42 are plans, elevations, and section of a superior pair of workmen's cottages suitable for any aspect except with fronts due north. As they contain practically the same, though slightly increased, accommodation as those shown on the last plate merely rearranged to suit the different aspect, there is no necessity to repeat what has been said as to the former pair; in this pair, however, the coppers can be fired from the outside as well as the inside, and by means of sliding doors above the coppers inside the scullery walls steam can be prevented from entering the sculleries, even when using the coppers from the inside.

The cost per foot cube works out at a slightly higher rate than the last pair, viz., 5'00d.; the total cost, including privies, is £427 16s. 5d., and to produce a gross return of 4 per cent., £8 11s. 2d. would be the annual rent of each cottage—a little over 3s. 3d. per week.

These form a very superior pair of cottages, suitable for the best class of working man to be found in villages.

Plate VIII.

Figs. 43-48 are plans, elevations, and section of a single detached cottage for a labourer. On examination it will be found that it is exactly half the pair shown on Plate V.; it will, therefore, be unnecessary to describe it afresh.

The cost of the cottage alone is £173 12s. 11d., which is about 5'84d. per foot cube; adding the cost of a single privy and ashpit (£14 12s. 4d.), the total comes to £188 5s. 3d. complete, ready for occupation, or about £18 more than for half the pair on Plate V. To produce a gross annual return of 4 per cent. on the outlay the rent would be £7 10s. 5d., or 2s. 11d. per week.

Figs. 49-51 show practically the same cottage with a small *milk dairy* added to make it suitable for a labourer having a small holding. This addition makes the third bedroom rather larger, the extra cost being about £8 10s., or a total cost of £196 15s. 6d. To produce a gross return of 4 per cent. the annual rent would be £7 17s. 7d., or about 3s. per week.

In both cottages on this Plate small fireplaces could be built in the sculleries.

Plate IX.

Figs. 52-54 show plans and section of a detached cottage suitable for a carpenter, bricklayer, foreman, or smith, and right for almost any aspect.

It contains good entrance lobby, giving direct access to every part of the

cottage, good and convenient living room having 150 superficial feet of clear floor space, convenient small parlour, scullery with copper so fixed that it can be used from the inside without any risk of steam filling the house when the copper is uncovered; the fuel store is incorporated in the main block, and the stairs start from the entrance lobby leading to three excellent bedrooms (and a small store-room) containing in the aggregate 3,200 cubic feet of air space.

The cost of the cottage amounts to £231 19s. 2d., or 5·48d. per foot cube, and, adding the cost of a privy and ashpit, the total cost is £246 11s. 6d., and to produce a gross return of 4 per cent. on this the annual rent would have to be £9 17s. 3d., or 3s. 9½d. per week.

Figs. 55-60 show practically the same cottage with a *milk dairy* added to render it suitable for a small holder.

The dairy and store-room over it adds about £24 to the cost, making a total of £270 15s. 8d. The annual rent would be £10 16s. 7d., or about 4s. 1d. per week.

Plate X.

Figs. 61-66 are plans, elevations, and section of a small house suitable for a holding of the best class up to 45 acres, and would do equally well for a second-class holding up to 70 or 75 acres, where the aggregate rents of the two holdings would be about the same.

On the ground floor is a very good living room, convenient parlour, good scullery, milk dairy, larder, store, and a very good entrance giving independent access to every part, with stairs starting from it and leading to four good bedrooms containing over 4,000 cubic feet of air space.

There is also an outside washhouse and a fuel store, the whole forming a most convenient and excellent house for a small holder, costing £287 17s. 8d., or 5·22d. per foot cube, and, adding £14 12s. 4d. for privy and ashpit, the total cost amounts to £302 10s., for which an annual rent of £12 2s. would be required to produce a return of 4 per cent.

Plate XI.

Figs. 67-70 are plans and sections of privies and ashpits to be provided for the cottages. Figs. 67 and 68 show a single privy to which may be added a piggery, if required; the privy, however, is complete in itself, and costs, according to the schedule of prices given for privies, £14 12s. 4d.

Figs. 69-70 show a pair of privies for pairs of cottages. A bill of quantities and schedule of prices is given for this pair on page 70, from which it will be seen that the total cost is £22 12s. 11d.

It will be convenient at this point, before entering upon a description of

the rest of the Plates, to discuss some of the features of the various designs illustrated on Plates II. to X., comparing several with those on Plate I.

In the first place, as might be expected, the detached cottages work out at a rather higher cost per foot cube than do the pairs—the former costing from 5·20d. to 5·84d. per cubic foot and the latter from 4·88d. to 5·48d., and the smallest pairs having the same number of rooms as the largest pairs, cost more per cubic foot than the latter.

Another point clearly demonstrated by the plans and estimates of cost, and one of which but few persons have any conception, is that *the plain square blocks are not necessarily the cheapest to build*—such, for example, as the three pairs on Plate I., but that small, judiciously disposed breaks in the walls by gables may not only add to the appearance, *but really reduce the cost* per cubic foot, as is clearly shown by the designs on Plates II. and III., compared with those on Plates IV. and V. Turning to the Schedule of Rents on page 61, we find that the plain pairs of cottages, Plates II. and III., cost 5·45d. and 5·48d. per foot cube respectively, whilst the two pairs, Plates IV. and V., work out at 5·38d. and 5·18d. respectively, with the still further advantage that a large portion in the front and back gables is added to the bedrooms, also allowing of the windows in the bedrooms being fixed with their heads close up to the ceilings. What really does add to the cost of cottages, or any other buildings, is the breaking up of the roofs with *numerous small windows*, which add practically nothing to the capacity of a building, whilst being *expensive to construct and often a considerable source of trouble and expense to maintain*.

One important feature of the designs on Plates II. to X. is that there are no awkward projections from the main blocks, which, when coming near windows, as in Figs. 1 and 2, Plate I., almost entirely prevent the circulation of air, or shut out the sun's rays from the rooms—both very important matters, which should always receive attention when designing cottages, &c.

Comparing the pair of cottages as per Figs. 1 and 2, Plate I., whose total cost, as previously stated, would not be less than £445, with the design on Plate VI. costing £403 17s. 5d., or with those on Plate VII. costing £427 16s. 5d. complete, we see that for *£41 and £17 less respectively* we obtain, by a more economical arrangement, far better accommodation in the latter two pairs of cottages than in the former pair; from which I leave the reader to draw his own inference as to which is the better thing to do, viz., to build according to plans properly designed on the principles already laid down or according to what his next-door neighbour does, in many cases through a mistaken notion that to depart from the orthodox thing means extra expense.

The same thing may be said on a comparison of Figs. 3 and 4, Plate I.,

with the designs on Plates IV. and V., which latter (as will be seen from the schedule on page 61) cost £26, and £35 less respectively than the former.

As to the general merits of the various designs, I will only point out that those on Plates II. to V. give the absolutely necessary accommodation required by a labourer and his family in the best and *most economical* form, and that those on Plates VI. to X. are adapted to the needs of artisans, &c., and small holders, given the essential requirements at the *least possible cost* consistent with comfortable, convenient, healthy, and substantially built dwellings.

CHAPTER III

SMALL HOLDINGS

AT the outset it is necessary to state that the important section of small holdings (in which section may be included most allotments) devoted entirely to the production of fruit, vegetables, and flowers, does not fall within the scope of this work. That such holdings can be highly successful where soil and especially climate are suitable there is no doubt, and that there is much room for their extension is equally certain; but it is with the larger and more general application of small holdings for the keeping of cattle and other live stock, supplemented by poultry, and fruit- and vegetable-growing where local conditions are favourable, that this book has to do.

The passing of the Small Holdings Act, 1892, and the frequent discussions bearing on the subject of small holdings is some evidence that the country is at last awakening to the evil results arising from the slow process of the extinguishment of small holdings which has been going on for a long period and until quite recent years.

This reduction in the number of small holdings has been caused principally by the belief entertained by landowners that it is *much more expensive and consequently less profitable* to provide homesteads for small holdings, as compared with the cost of a like provision for large farms, with the result that when the old buildings on small holdings have fallen into decay, and become too dilapidated to serve their purpose any longer, the holdings have frequently been added to the adjoining farms. I hope, however, to prove to my readers by the *aid of plans and estimates that the cost of the equipment of small holdings is not much in excess* of that for larger farms, and that the extra cost proportionately per acre (if any) is far more than counterbalanced by the benefits conferred on all landed properties by the maintenance of a reasonable number of small holdings interspersed with the larger farms, thus preserving the connecting link between the labourer and the farmer, to which may be

added the benefits conferred on the small holder himself, resulting indirectly in the good of the country generally.

It is common knowledge with those well acquainted with rural life that the *most intelligent and industrious* youths of the labouring class quit the land on which they have been born and brought up for the simple reason that they see very little chance of rising beyond the position of a day labourer, and the result is that in these days the farmer can secure none but second- or third-rate labourers—an expensive quality in most men and things—a point borne out by the Report of the Royal Commission of 1882, to which I have already had occasion to refer. The report of the Commission contained a statement that, whilst farm labourers were available in sufficient numbers, their quality was inferior, and as a result labour on the farm was expensive. And there is no doubt that this effect has been produced partly by the reduction of small holdings, resulting in the best class of agricultural labourer seeking more lucrative and promising employment.

That the farmer has been affected in the way above stated, seeing that my statement is borne out by a Royal Commission, my readers will probably not question; but it may not appear quite so plain how the landowner has been injured by his own policy, and more especially by that of his predecessors in the matter of small holdings, and to explain this it is necessary to go back half a century and compare the condition of things then with that which obtains to-day. Formerly the smallest holder, keeping one or perhaps two cows, *formed an important class of farm labourers*, of which there is scarcely one to be found to-day, and in due course some of these more successful small holders improved their position by thrift and industry till they developed into highly successful farmers on a larger scale, thereby *benefiting the landowner* and the country by helping to keep up the best class of British farmer. No more conclusive evidence of the benefit to the landowner could be adduced than a comparison of the very impoverished condition of many estates composed almost entirely of large farms with the condition of those estates comprising proportionately fewer large farms with a large admixture of small and medium-sized holdings, the latter having *withstood the adverse* agricultural conditions which have prevailed during the last quarter of a century much better than estates composed mainly of large holdings.

To remedy these evils there should be in all districts wherever suitable a sufficient number of small and varied sized holdings interspersed among the larger ones as an inducement to thrift and industry amongst farm labourers, enabling those of superior qualities to rise to something beyond a day labourer.

Having arrived at the conclusion that it is desirable in the interests of the labourer, farmer, landed proprietor, and the country generally, that the number

of small holdings should be increased, we have to consider the question as to what sizes of holdings are suitable, their equipment in the way of buildings and the cost of the latter.

Dealing with the equipment first, since the question of equipment applies to all small holdings, the buildings for the live stock should be substantial and so arranged as to provide healthy and convenient accommodation, the old idea that a cow on a small holding can be safely housed in any dark, badly ventilated, and badly-paved hovel is almost exploded, and that a cow to be kept profitably requires just the same accommodation on a 3-acre holding as on one of 300 acres is to some extent being realised.

As I give in another place plans and descriptive text of buildings for holdings of various sizes it is unnecessary for me to go into detail here, with the exception of one matter to which I attach the greatest importance and on which there is at present almost I might say incredible ignorance displayed, viz., the preservation of the by-product of every homestead—manure (dung and urine).

One finds on all small and medium-sized holdings and on a large proportion of the larger farms, *the whole of the urine and a large portion of the most valuable parts of the dung being constantly washed away from the yards into the nearest ditch*, involving a loss of manure equal in value from one-fourth to one-half the rent of the land occupied. In my work "Modern Homesteads" I went fully into this, showing that the annual loss to the farmers of this country arising in this way amounts to some millions sterling; but for the benefit of the small holder I will shortly state the amount which *may be lost where only one cow and a pig are kept*, from which the probable loss on a larger holding where more animals are kept may be arrived at by simple multiplication.

First of all, it is necessary to know what are the constituents of the food passed off in the excreta, and which give to the latter its manurial properties; they are nitrogen, phosphoric acid, and potash. It should be further understood that a very small proportion of these constituents of the food are used up in respiration or in forming flesh or milk, and that the bulk is passed off in the dung and urine, the proportion in either depending upon the class of food supplied to the animals. In the case of roots, cake, or meal, these being easily digested and concentrated foods, and passing into the circulation, a large proportion of the above constituents would be passed off in the urine, and if hay and straw formed the bulk of the food there would be a less proportion digested and assimilated, and in consequence a much larger proportion of the valuable constituents would pass off in the dung.

Now taking the case of an average cow giving two gallons of milk per

day, and supplied with an average ration of hay, hay chaff, roots, and a mixture of linseed and cotton cake and meal for thirty weeks of the year in the stalls, the dung and urine for that period (before waste) would contain on an average 135 lbs. of nitrogen, 55 lbs. of phosphoric acid, and 104 lbs. of potash, the total market value of which as manure is £5 2s.; and to allow *all the urine*, containing a considerable proportion of the above constituents, *to run directly to waste* and throw the dung about an open yard, as is almost universal, to be constantly washed with heavy rains, often extending to from one-half to three-fourths of the year results in direct loss of not less than three-fourths of the valuable constituents or a loss of anything up to £3 16s. per cow stalled for the winter; and for each 25 stoncs of pork fed in the loss of £1 at least. Hence it will be clearly seen that on a 3-acre holding treating the dung and urine in the usual way involves a certain loss of from £3 10s. to £4 10s., or over half the amount of a good rent for the land and buildings, as shown by the Schedule of Rents on page 61. The average outlay on the six covered yards and dung pits does not amount to more than £5 for each cow and pig kept, involving an annual charge of but 4s. to prevent the loss I have just described.

It would be difficult to believe that this loss does take place if one did not actually see it going on on a large proportion of the farms of this country. To give an instance from my own experience, a tenant farmer, farming medium quality sandy loam land, kept a herd of twenty-four to thirty good dairy cows; these were well fed in the stalls, the buildings in which they were kept forming three sides of an open fold yard. Very little other stock was kept save pigs and two or three horses. The dung from the cowsheds and piggeries along with but very little litter was thrown into the yard, which in winter became a quagmire 3 or 4 feet deep, and was impassable by both man and beast.

The tenant, for the purpose of getting rid of the nuisance, decided to roof the yard, in order to keep it dry; this was done, and in the following season the same number of loads of manure from the now covered yard was applied to the root crops as in previous years; there was subsequently such a marked difference between the crop and all previous ones, which had received just the same quantity of manure from the same place, that the farmer began to suspect that covering the yard had something to do with it, and of this he was quite satisfied before the crop was lifted, the result being twice the weight of roots per acre to that of any previous crop on the farm.

This increase in the crops was maintained in subsequent years, the farmer securing numbers of seedsmen's prizes in addition to other local prizes for his root crops; and his emphatic opinion ever after this experience was that one

load of dung made by well-fed cattle in a properly covered yard was worth more than two loads made by the same cattle and thrown into an open yard.

Into the question of scientific experiments that have proved the same thing I do not propose to enter, as the subject is too highly technical for a work of this character; suffice it to say that this enormous waste year by year constitutes, in my opinion, one of the weakest points and the worst feature of the otherwise best system of agriculture in the world, which fact must be my apology for dealing with the subject at such great length.

We now come to the question of the most suitable sizes of holdings, the cost of the equipment, and the rent which should be charged.

Commencing with the smallest holding, suitable for the intelligent and thrifty farm labourer, who has saved sufficient to properly stock a holding with one or perhaps two cows, and is anxious to further improve the position of his family, we have 3 acres and a cow (to which latter may be added the pig and a calf).

The question is, what would be a reasonable rent for a labourer to pay for 3 acres of fair quality grass land and suitable buildings, in addition to the rent of his cottage and garden, these latter being necessary for him whether he has the 3 acres or not, and so do not, in this case, affect the question of rent for the land, which would be remunerative to the landlord as well as leaving the small holder a fair margin of profit for his labour.

Three acres of fair quality grass land would be ample for one cow and for rearing a calf, supplemented by a little cake, meal, and roots, which latter should be grown on some part of the cottage garden.

A fair average cow should give a gross return of £25 in the year, and taking £6 as the rent of the holding, which would give the landlord a return of 4 per cent. on his outlay on the buildings plus £1 per acre for the land, there would be left £19 for extra foods, litter, insurance of stock and other minor expenses, and a return on the tenant's labour, and with fair management the net result from the cow and a pig should be a balance of from £7 to £9 of receipts over payments—not a large amount, it is true, but to a man earning no more than £50 a year the balance represents a substantial sum; but beyond the actual cash profit there is something in being the actual owner of a cow, since it gives the intelligent labourer an interest in his occupation and his home which he can scarcely obtain in any other way, and is a factor which often does more to improve him and his family than most other agencies.

I have named £6 as a fair rent for the 3 acres and buildings. If £3 be put down as the rent of the land without the buildings, it is much above the average for the whole country, which cannot be more than 12s. 6d. to

15s. per acre, plus 4 per cent. on the cost of the house and buildings let with the land, so that £1 per acre is very liberal for the land alone, leaving £3 as interest on the outlay on buildings for live stock.

As a cowshed to accommodate one cow only cannot be erected, it follows that where but one cow is to be kept the buildings will cost more per acre than if the holding were larger, and as matter of fact a block which would properly equip a holding large enough for two cows must be taken, such as is shown on Plate XI., Figs. 71-77, which provides for two cows; the reason for this is if the shed were made narrow enough for one cow-stall only, the cow might be got inside but there would be great difficulty in getting her out again alive.

The detached cottage, Plate VIII., Figs. 49-51, is suitable for a labourer keeping either one or two cows.

The next stage is a holding of 6 to 8 acres and two cows, pigs, and calves, and is well adapted to the better class of labourer who does not wish to confine himself to serving one employer entirely on every day in the year, but desires to have some spare time for his own holding, and when not engaged on the latter to do some of the more important class of work, mostly by piece-work, for neighbouring farmers—a most useful class of men in all villages, but rarely to be found in these days.

Assuming that he has 8 acres of grass, the block of buildings previously mentioned will be suitable, and if we allow £8 as the rent of the land plus £3 for buildings, the whole amounts to less than 28s. per acre; but in this case, as the man would only be employed say four days per week *off his own holding*, one-third of the rent of his cottage and garden, viz., £2 12s. 6d. must be added to his small holding expenses, making the total for these £13 12s. 6d., or about 34s. per acre.

The cottage on Plate VIII., Figs 49-51 would be suitable for this holding also, unless the labourer's wife happened to be one of the best of her class, in which case she would probably prefer the scullery enlarged a little, and fitted with a fire-grate, &c., at an extra cost of about £10.

The next stage is a holding of 10 to 15 acres of nearly all grass, to which the tenant would devote the major portion of his time, more particularly in winter, occupying his spare time in doing odd jobs for neighbouring farmers, chiefly in the spring and summer months when less labour would be required on his own holding and his services be in greater demand by the large farmer.

For such a case the buildings on Plate XII., Figs. 78-81, are adapted; the cottage on Plate IX., Figs. 55-60, would be suitable, or it might even be contracted a little to cost £250. From the Schedule of Rents we find that the rent of the buildings is £4 4s. 9d., and of the cottage (costing about

£250) £10 per annum, and allowing 38s. per acre as a fair rent of the whole holding, say of 14 acres, the rent of the land alone works out at £12 1s. 3d., or 17s. 3d. per acre.

The next stage is a holding of 2½ acres, which might be entirely devoted to milk production if near a large population, or if not so situate, then partly to milk production and partly to cattle-raising, and to which the tenant would devote nearly all his time.

If devoted to milk production entirely the buildings shown on Plate XIII., Figs. 86-88, are suitable, with the cottage on Plate IX., Figs. 55-60, the total cost being £428 6s. 2d.

Assuming a fair rent for the holding to be 32s. per acre, or £38 8s. per annum, deducting 4 per cent. on the cost of the buildings, viz., £17 2s. 5d., there is left 17s. per acre for the land.

If the same holding were devoted to milk production combined with raising young stock, the block of buildings shown on Plate XII., Figs. 82-85, would be suitable with, of course, the same cottage, the return in the shape of rent being practically the same per acre.

Following this comes the case of the man who would devote the whole of his time, summer and winter, to his land, extending to, say 30 acres, of which a small portion might be arable where the soil is suitable.

For this the block of buildings, Plate XIII., Figs. 89-91, are adapted with cottage, Figs. 55-60, Plate IX.; taking 30s. per acre as the rent of the whole, or £42 per annum for 28 acres and deducting £18 7s. 2d. for rent of cottage and buildings, we get £23 12s. 10d. as the rent of the land alone, or 18s. 10d. per acre.

The final stage of a small holder is the one in which he may be said to merge into what is usually designated a "farmer," and where he holds sufficient land to occupy both himself entirely and his sons till they leave home to become in turn small holders themselves, in which case the holding may extend from 35 to 45 acres of good land up to 45 to 60 acres of medium quality mixed arable and grass.

The block of buildings, Plate XIV., Figs. 92-96, would be well adapted to such a holding with the addition of the cottage, Plate X., Figs. 61-66, the total cost being £700 10s. 7d., for which the rent would be £28 per annum.

Taking a holding of good land as being worth 35s. per acre, the rent for 40 acres would be £70; deducting £28 rent of buildings we have left £42, or 21s. per acre for the land.

In the case of medium quality land of, say, 50 acres, at 28s. per acre for the whole holding, the total rent would be £70 per annum; deducting £28 as before, we have left £42, or 16s. 10d. per acre, for the land.

Every small holder should have a good kitchen garden, and (with the exception of the one keeping only a single cow and being in the constant employment of a neighbouring farmer) should have *half an acre at least of such garden land*, the portion not required for growing vegetables, &c., being used for growing ox cabbage, swedes and mangels, for winter use, these latter being essential for dairy cattle. A quarter of an acre of good garden land, kept in a high state of cultivation, will, with a comparatively small amount of labour, produce 8 to 10 tons of swedes and mangels, worth £6 to £8.

The rents of the cottages for small holders allow of a garden of larger size than the smaller cottages have; the more rent the tenant pays for his cottage the more garden he is entitled to.

The gardens of both cottagers and small holders should be well stocked with the best varieties of standard fruit trees. These at a comparatively small outlay are often a source of considerable profit, and it is here that the small holder has the advantage of a large farmer. The small holder has in winter to devote more labour to his cattle than in summer, and it is during the latter period that work is required in his garden; so that a combination of a *large garden, orchard, and small holding* offers the best chance of success, and every owner of land when building new cottages or establishing small holdings would be well advised to provide *good gardens*, spending the small sums required to stock the gardens well with the *best varieties of standard fruit trees*. Cottagers and small holders have not, as a rule, the requisite knowledge or experience to enable them to make the best selections and on the best terms, with the result that the stocking of the gardens is done badly or not at all.

Most landowners have an expert gardener, under whose supervision a judicious expenditure of £5 per annum, extending over a few years, will convert an uninteresting village into a charming and highly profitable series of orchards and gardens—in fact a *garden city in miniature*—a point which cannot be too strongly urged upon all owners of rural estates.

There is one point in connection with small holdings which should not be forgotten, viz., the suitability of the small holder's *wife* for the position of such. Success as a small holder depends as much on the wife and the training she has received as on the man himself. If the wife have been well trained in domestic service, particularly if she have received her training on a farm, there is some hope of her being a suitable wife for a small holder; but if, on the other hand, all her early years after leaving school have been spent in *factories* and in trains, travelling to and from her employment (as is so often the case with young girls living in villages) she can scarcely be a suitable wife for a small holder, and if the latter happen to marry such an one, failure is almost certain; hence the necessity of considering not only the suitability of the man himself, but that of his wife also.

CHAPTER IV

DESCRIPTION OF BUILDINGS ON PLATES XI. TO XIV.

Plate XI.

FIGS 71-77 are plans, elevations, and sections of a small block of buildings suitable for milk production for a labourer keeping one or two cows on a holding up to 8 acres, according to the quality of the land.

The block comprises stalls for two cows, food store and a calf-house, the two latter places being divided from each other by a boarded partition 4 feet high; there is also a piggery and covered manure pit, which for economy are roofed in together; the walls round the manure pit are low ones finished with a half-round brick coping, the roof being supported by pillars, thus leaving openings for the circulation of air about the manure.

There is also a small loft for litter, &c., over part of the food store and calf-house.

The whole of the drainage from the calf-house and the cowshed would run in a channel at the heels of the cows, then in front of the piggery to the manure pit; the latter would have a sunk and dished bottom covered with cement concrete, in order to render it impervious. This yard would protect the whole of the dung and urine from waste by rain or otherwise, and no underground drains would be required.

The cost of the cowshed, calf-house, food store, and piggery, based on the priced bill of quantities given for Plate XIII., Figs. 89-91, on page 71, is £62 11s. 7d., and for the walls, gate, and roof, &c., to the manure pit £11 1s. 7d., making a total of £73 13s. 2d., and to produce 4 per cent. interest on this an annual rent of £2 18s. 10d. would be required.

Plate XII.

Figs. 78-81 are plan, &c., of buildings for a holding 10 to 15 acres, suitable for milk production. The buildings comprise cowshed with stalls for four cows, and a fodderum at the front of the cows, from which it is separated

by rails along the back of the manger, thus facilitating feeding operations; as before there is a calf-house, piggery, and covered manure pit.

The urine from the cows passes to the manure pit by a channel in front of the piggery, and a 4-inch pipe drain is required for the same purpose from the calf-house.

The cost of the block excluding manure pit at schedule prices is £94 0s. 10d., and for the manure pit £12 5s., making a total of £106 5s. 10d.; 4 per cent. on this outlay is £4 4s. 9d., which sum represents the annual rent of the buildings.

Figs. 82-85 are plan and sections of buildings for a holding of 15 to 24 acres suitable for milk production and raising young cattle. There is a cowshed for four cows, fodderum, box for horse or cattle, calf-house and piggery; also a covered yard 14 feet \times 22 feet divided into two compartments for manure and young cattle; a food store for use with the yards forms part of the main block, and there is a straw loft over the piggery.

As before, the fodderum would be separated from the cowshed by rails at the back of the manger, facilitating feeding and free circulation of air about the cattle.

A drain is required from the calf-house to the manure yard taking up on its way the drainage from the cowshed and box.

The buildings (excluding yards) cost on schedule prices £121 5s. 11d. and adding £37 7s. 3d. for the covered yard the total amounts to £158 13s. 2d., 4 per cent. on which is £6 7s., which sum represents the annual rent for these buildings.

Should a cart-shed be found desirable, a lean-to 15 feet \times 8 feet could be erected at very trifling cost at the north end of the covered yard.

Plate XIII.

Figs. 86-88 are plan and sections of a block of buildings for 18-24 acres, suitable for milk production. There are stalls for six cows, fodderum at front of same, box for horse or cattle, calf-house, piggery, and covered manure pit and a cart-shed with a straw loft over the latter and the box.

The cost of the block excluding manure pit is £144 18s. 7d., and adding £12 11s. 11d. for the manure pit the total is £157 10s. 6d. An annual rent of £6 6s. would return 4 per cent. on this outlay.

Figs. 89-91 are plan, section, and an elevation of buildings for a holding of 20 to 27 acres, adapted for milk production and raising cattle.

The accommodation is practically the same as in the last block, with the exception of there being a covered yard 15 feet \times 20 feet, divided into two compartments, in place of the manure pit. The dung and urine can pass direct

into the yards from the cowshed, and drains are required to convey the urine from the calf-house, box, and piggery.

There is a straw loft over the piggery, calf-house, box, and part of the fodderum.

The cost of the buildings is £146 16s. 6d., and of the covered yard £30 9s. 3d., making a total of £177 5s. 9d., which at 4 per cent. gives £7 1s. 7d. as the annual rent required.

Plate XIV.

Figs. 92-96 show plan, elevations, and a section of a very complete block of buildings for a holding up to 45 acres of good land, or up to 60 acres of land of medium quality, suited to a grass holding (milk production) or a holding of grass and arable land.

There are stalls for eight cows, with feeding passage at the front of the mangers, food-house 17 feet and 18 feet, two boxes for horses or cattle, cart and implement shed, calf-house, two piggeries, and a boiling-house with a covered yard. A gangway on three sides of the covered yard would be paved with bricks, and the remainder dished and rendered impervious with cement concrete.

The cost of the buildings, exclusive of roof, &c., to the covered yard, is £357 18s. 7d. and of the covered yard £40 2s., bringing the total up to £398 0s. 7d., on which the rent charged would be practically £16 per annum to produce 4 per cent.

If the holding had a fair proportion of arable land, it might be advisable to put a chaff-cutting chamber over the food-house by raising the walls 5 to 6 feet, and putting in a floor, the cost of which would be about £20.

It will be noticed that in the various sets of buildings there is no provision for poultry. It must not be inferred from this that I attach no importance to poultry-keeping by small holders; on the contrary, it should be made a source of profit, much more than is now generally the case. To be profitable poultry must not be kept in large numbers in one place, and they should never be mixed up with other live stock, as they have a great propensity to roost everywhere except in the proper place, at the same time fouling the food and the mangers of the cattle; for this reason a poultry-house forming part of the main block is objectionable.

Poultry should be kept in lots of not more than from 15 to 20 in one house, and if more are kept the houses should be dotted about the holding in suitable sunny but sheltered places. The houses are best constructed of wood, with tarred felt roofs; they should be quite dry, and well lighted and ventilated. Most labourers can construct them at small cost, or portable

ones can be bought very cheaply from manufacturers, who make a speciality of such buildings, and it is *quite unnecessary and inadvisable* for the landlord to provide them in conjunction *with the buildings for cattle.*

Comparative Cost of Buildings for Large Farms and for Small Holdings.

If we take the six sets of buildings, being one for each size, for small holdings shown on Plates XI. to XIV., we find the total aggregate estimated cost to be £1,071 9s., including the cost of the covered manure pits and yards in each case; to this must be added the cost of the house accommodation (including only a portion of the cost of the cottage where the labourer is wholly or partially employed outside his own holding), which amounts to £1,107 16s. 6d., or a total cost of houses and buildings of £2,179 5s. 6d., which sum will provide the best equipment for 150 acres of good land up to 180 acres of medium quality, or, say, 165 acres of average quality.

The total cost of the equipment of a farm of 165 acres of average quality land would be at least £1,000 for the buildings, for live stock, implements, &c., £650 for the house, and as two labourers at least would be required beyond the workers accommodated in the farmhouse, two cottages would be required—to complete the buildings—costing, say, £310, making a total of £1,960, or £219 less than the estimated sum required to equip the same acreage *in six various sized small holdings*, the interest on which latter sum at 4 per cent. would amount to *a fraction over 1s. per acre per annum on the 165 acres*; but we often find small holders paying from 5s. to 10s. more per acre than the large farmers of the same district for precisely the same quality of land; but even if no increased rents were charged to small holders, the benefits conferred on all districts by increased numbers of these men would far more than compensate for the small difference in the relative cost of equipment of large and small holdings.

CHAPTER V

PRINCIPLES OF CONSTRUCTION APPLIED TO COTTAGES AND BUILDINGS FOR SMALL HOLDINGS

I DO not propose to give a detailed specification for the erection of a cottage or a block of buildings, but rather a short general description of such matters as the nature of sites, points of construction specially applicable to cottages and farm buildings, and the nature of material and labour which should be used, to serve as a guide for a specification to be written by foremen or clerks of works.

Although a plan of a cottage or a block of buildings may suit a great number of cases, and with very slight expansion or contraction may be adapted to still more, a *stock* specification is perfectly useless, and indeed may even be mischievous through not being adapted to local circumstances of site or material, causing considerable difficulties as the work proceeds and involving extras and omissions, all of which is to the pecuniary disadvantage of the building owner.

Before a specification is prepared the site must be inspected, the facilities for drainage and water supply ascertained, and what local building material, if any, is available. Having obtained this information, the specification should clearly state the class of material and labour to be used, avoiding as much as possible such stock phrases as "best" this and "best" that (unless the name of the maker from whom the goods are to be obtained are specified, as, for example, "best quality pressed blue paving bricks, to be obtained from Brown, Jones and Robinson, Limited, of —, Staffordshire"); take, for example, the stock description of "best red deal," "best memel fir," or "best sheet glass," &c.; now the *best qualities* of these materials are *never used* in ordinary buildings, and very seldom indeed is the *second quality used*, and it is well known that in cases where the term "best red deals" has been used in the specification fifth and sixth qualities have been put in the building; hence the importance of specifying the *exact quality* of materials it is intended shall be used.

General Principles.

One of the most important rules which should be borne in mind when erecting any building is that the building must as far as possible be so constructed that it will remain *perfectly dry* from the under side of the roof to below the ground floor; it should ever be remembered that dampness in a building is destructive of the fabric and very injurious alike to human beings or animals occupying it. Nearly all buildings and building materials are destroyed by chemical action and low forms of vegetable and animal life, and as the *presence of moisture* is essential for such chemical action to take place or for the low organisms to carry on their destructive work, it will not require any further argument to convince my reader of the necessity of excluding all dampness possible.

Another matter by no means unimportant in these days of dear building is the judicious use and disposal of both material and labour in a building in a manner best suited to the character of the building; much labour and material is often wasted by putting into parts of a building more of both than is essential, or in endeavouring to make a building appear other than what it really is or is intended to be, *e.g.*, trying to give a rural labourer's cottage the appearance of a suburban villa.

Site.

In fixing the sites of cottages the following points should be borne in mind, viz., (i.) water supply, (ii.) drainage, (iii.) shelter from the rougher and colder winds, (iv.) cottages should be built within a reasonable distance of a school, and should never be erected singly or even in pairs *in isolated places*, otherwise it will be difficult to keep labourers in them, on account of the wife very reasonably having a great objection to being left alone for hours together in an isolated spot, and a compromise between the village and the farm must in most cases be adopted.

With regard to small holdings the most suitable land and enclosures would determine their position, but even here very isolated spots should be avoided for the very smallest holdings. Holdings up to 10 acres are better if all grass, and above that area up to 30 acres a very small amount of arable land may beneficially be included, and above that area more mixed holdings can be adopted. A small holder as a general rule cannot provide and keep up the necessary horses and implements to properly cultivate arable land, so that it is only when approaching 30 acres, more than an acre or two can beneficially be included. In every case in selecting the sites for buildings for a small holding regard should be had to *water supply* and shelter from rough winds.

The whole of the site to be built upon or paved should have all vegetable matter removed from it before commencing to dig trenches.

The ground floor of the cottages should be at least 8 inches above the surface of the ground immediately abutting on the external walls, and the surface of the ground should then fall from the cottages for a distance of not less than 15 feet and have a fall in that length of 4 to 5 inches so that in case of excessive rains the water will not stand about the buildings; and if the soil be a very wet one there should be a drain on the outer edge of the 15 feet where the water is likely to collect, formed of pipes laid with open joints and filled up over the top with hard, porous material, and there should of course be an outlet to the drain emptying into a ditch or tank, &c.

Foundations.

The trenches for the walls should be dug to the bottom of the surface soil and at least 12 inches below the natural surface of the land, and deeper where necessary to secure uniform solidity, bearing in mind that whilst it is desirable to have a solid bottom for the walls to rest on, the uniformity of such bottom is of equal importance; if one part of the trenches be more solid than another part, as the building progresses and the weight on the foundations increases there will probably be an unequal settlement of the substrata, and fractures in the building may take place.

Drains.

Glazed socketed pipes of good quality should be used and the joints be made with Portland cement, the pipes, as each is laid, being well raked out, and they should have a fall of not less than 1 in 40.

At all points of discharge into sewage drains glazed earthenware gulleys should be provided fitted with iron gratings, and, if required, a glazed channel, or in lieu thereof should be paved round 14 inches wide with blue bricks set in cement, and all gulleys should be bedded on concrete.

There should be an air inlet at the lowest point of the drain and an outlet at the highest point, the latter being formed by a 4-inch round cast-iron pipe fixed to the wall of the cottage and carried above the roof and finished with a cowl or galvanised iron wire cover.

The outlet for the drains and the mode of disposal of the sewage and the rain-water will depend entirely upon local circumstances, so it would be useless to deal with it in these pages.

Materials Generally.

Both buildings for small holdings and cottages should be constructed principally of bricks, or stone and timber, and be roofed with dark red flat

tiles (except covered yards and manure pits); whether brick or stone be used for the walls will depend on local circumstances. All the drawings, details, and bills of quantities are prepared on the assumption that locally made bricks would be used, but they can be very easily adapted to special cases.

Lime.

This should be of an approved quality, and for mortar should be mixed with clean, sharp sand in the proportion which experience has proved to be the best for the particular lime, and which may vary from one part of lime to one and a half to two parts (by measure) of sand, depending on the composition of the stone from which the lime is obtained.

Cement.

The cement should be of a make well known for its good qualities (the maker's name being specified) and for screeds, pointing, or for rendering should be used with an equal quantity of sand; for concrete under floors it should be mixed with three to four parts of clean, hard material broken in pieces $\frac{1}{2}$ to $1\frac{1}{2}$ inches square (not broken all to a uniform size, but of mixed sizes, some large and some small); for concrete in foundations the proportion may be from five to six parts of the same material to one part of cement.

Timber.

For rough timbers a named brand of "thirds"—Geffle, or its equivalent—should be used, all very sappy or defective pieces being rejected. For wrought work a specified quality of St. Petersburg or Archangel, free from sap, shakes, or dead knots should be used.

All unusual sizes of timber should be avoided as being wasteful, *e.g.*, a piece of timber 8 inches \times $3\frac{1}{2}$ inches would have to be cut from a piece 8×4 , and, the $\frac{1}{2}$ inch left being practically of no value, the $8 \times 3\frac{1}{2}$ would cost as much as the 8×4 .

Walls.

If the walls are of brick, the bricks should be hard burnt ones of a good red colour on all external faces; bricks of unknown quality should not be used.

The brickwork should be grouted from the bottom of the footing to the damp course, and be flushed solid with mortar above the latter; the joints should not exceed $\frac{5}{16}$ of an inch in thickness and should be struck as the work goes on.

For facing purposes stock bricks specially selected of a good even colour and square on the edges look very well, and in nine cases out of ten make a sounder job than special facing bricks, besides being considerably cheaper.

Where the bricks are of a very hard, non-porous character, solid one-brick outer walls will be sufficient, but if the bricks are very porous the external walls of the building should be built of two half-brick thicknesses with a 2-inch cavity between the two parts, these being bonded together with from 4 to 6 galvanised iron ties per superficial yard. The ties should be twisted or have a sinking in them to prevent moisture being conveyed from the outer to the inner part of the wall, which of course would defeat the object of the cavity.

Arches over external openings should be turned in selected ordinary bricks in half-brick rings, two rings for the smaller openings and three rings for the larger ones (such as living-room windows) and be set in cement, all skewbacks being cut to the proper radii.

All external angles, angles of doorways, &c., in buildings used by live stock should be rounded, *i.e.*, be built with bullnose bricks; where frames are used in 9-inch walls this is not, however, necessary.

Damp-proof Course.

For the reasons stated at the commencement of this chapter, there must always be a course of some impervious material laid over the whole surface of the walls at least 3 inches below the ground-floor level of the cottages and at the floor level of the buildings. This damp-proof course may be made of either a double course of sound slates laid to break joint in cement, or of hard-pressed blue Staffordshire bricks set on a cement bed and jointed with cement: other materials there are, but they are either unsatisfactory or expensive.

Chimneys.

Huge chimney-heads with many courses corbelled out should not be constructed as they are very liable to decay quickly, thereby rendering necessary frequent and expensive repairs. A simple head, such as Fig. 101, Plate XV., is quite suitable for cottages, and there is nothing to get out of order.

Small red terra-cotta pots of plain pattern set and flanchéd round with cement should be fixed over each flue.

Pavings.

On dry sites of sand, gravel, or stone, a layer of hard, broken materials, well rammed solid, covered with a cement screed $\frac{1}{2}$ inch thick, left to harden before any paving is laid on it, will suffice for a basis for all quarry paving, and in cases of brick paving the cement screed may be dispensed with when the paving is not inside a cottage. Fig. 103, Plate XV., shows details of this.

Where the site is on wet clay, &c., the hard, dry materials should be replaced with cement concrete.

The living rooms and lobbies should be paved with very hard, best pressed red quarries $6 \times 6 \times \frac{3}{4}$ inch of a specified make laid in cement, and in the sculleries, larders, and store, blue quarries of the same kind and size should be used. The coal-store should be paved with stock bricks specially picked for hardness, set on edge and grouted with lime. The yards about the back of the cottages should be paved with $1\frac{1}{2}$ -inch blue chequered pressed bricks having on all outer edges a brick on edge kerb.

It should always be remembered that any dampness under tiled floors tends to soften the tiles, which consequently wear away much more quickly than if kept dry. If we desire to grind down or smooth the face of a brick or stone we apply water to soften it and so expedite the operation, and the same effect is produced in a damp tiled floor.

Stonework.

Stone of very hard texture from named quarries should be used for all thresholds, hearths, window-sills, &c.

The window-sills should be about 7 inches longer than the widths of the openings externally in the brickwork, and should be not less than $4\frac{1}{2}$ inches thick, sunk, weathered, throated, and grooved, as shown by Fig. 98, Plate XV.

Roofs.

The roofs on the cottages should be of about 42 to 45 degrees pitch with the horizontal, and 40 degrees on the offices, cattle-sheds, and other such one-story buildings, and in each of these cases the covering should be of plain, flat tiles about $6\frac{1}{2} \times 10\frac{1}{2}$ inches. Tiles render a building much warmer in winter and cooler in summer than do slates, and they are much less liable than the latter to be damaged by storms, and when necessary can be effectively repaired by a bricklayer, whilst an expert is required to repair a slated roof, and even he can seldom cure a defective one till it is entirely stripped and re-slatted, involving considerable expense.

The tiles should be very hard-burnt ones, preferably of a dark red colour, and the best quality of a particular make should be specified. The tiling should be laid to about a 4-inch gauge on laths $1\frac{3}{8} \times \frac{3}{4}$ inches, which latter should be sawn out of a specified brand of timber, selected free from sap. On no account should laths sawn abroad be used, as they are generally of a most inferior description.

If the tiles have nibs for hanging them to laths, there is no necessity to nail them (except at the ridges and eaves) to the laths, and although nailing

is the orthodox thing it is both wasteful and disadvantageous, since any tile which becomes broken cannot be removed without stripping a considerable piece, and in all the work I have carried out I have never had the tiles nailed, and have seen roofs which were in existence over 40 years ago, without the tiles nailed, and which up to the present time have not suffered any damage in consequence; nailing, in fact, does away with part of the advantage which tiles have over slates in the matter of repairs.

Short tiles should be used for the lower course at all eaves and at the top courses next the ridges, and tile and half-tiles should be used at gables, which is to be preferred to cutting ordinary tiles, and there is no extra charge for tile and half-tiles per square. If there are valleys on the roof, very hard-burnt valley tiles of the proper shape to suit the pitch of the roof should be used, and not lead, which is both expensive and not so satisfactory. At the ridges dark red capped tile ridges should be used, bedded solidly in cement and pointed with the same.

The whole of the tiling should be full torched on the under side with fine hair mortar or bedded in the same where it cannot be torched, as shown by Fig. 105, Plate XV.; this torching, besides being a non-conductor of heat, binds the tiles well together.

With regard to timbering, the roofs should be so framed together that *no horizontal thrust* can be conveyed from the roof to the walls, and to secure this object the plates to which rafters are secured should be well tied together with iron ties going from one plate to the other where possible; and where this cannot be done owing to intervening windows the ties should be in the longest lengths possible, the ends being turned down and nailed to the plates or being turned up into the brickwork. These ties should not only be fixed across all gable walls but also at intervening cross walls and at trusses.

The wall plates should be of sufficient breadth to enable them to resist the thrust of the roof between the ties (including at times the weight of snow and wind pressure) otherwise the walls may be *pushed outwards at the top*—a condition of things one often finds, and which is generally due to the insufficient width and strength of the wall plates and defective tying together at cross walls and trusses. In cases where the plate is over 8 feet in length between the ties it should be increased from $4\frac{1}{2}$ to 6 inches in breadth, which will be sufficient for all cottage roofs up to lengths of 14 feet between ties and there are none required over that length.

The common rafters should be $2\frac{1}{2} \times 3\frac{1}{2}$ inches up to 20 feet in span, and 4×2 inches when over that span, fixed not more than 13 inches apart, and in the case of cottages should project sufficiently beyond the wall-plate at the foot to give the tiles 12 inches projection from the face of the wall, as shown

in Fig. 105, Plate XV.: a rafter should also be fixed about 6 inches from the external face of the gable walls to carry the tiling about 12 inches beyond the wall, the end of the gables being finished with a verge board, which should not be elaborately moulded.

The eaves and gables on the buildings for live stock should be finished in a similar manner, but project about 3 inches less, as shown by Fig. 111, Plate XVI.

All purlins and plates will of course be carried beyond the gables at each end to support the verges, &c., and by this means adding stability to the gables instead of tending to thrust them out, as may happen where the ends of the purlins rest only on the inner half of the wall, besides which the projecting roof is an excellent precaution against damp penetrating the walls, as well as adding considerably to the external appearance at trifling cost.

At the junction of all roof tiles with chimneys or walls soakers of 4 lb. lead 6×8 inches should be inserted under the tiles and be flashed with 5 lb. lead stepped flashing or with aprons 12 inches wide, as the case may be; where necessary, gutters of 5 lb. lead supported on inch boards and bearers should be inserted.

All flashing should be secured by raking out the joints of the brickwork, turning the lead in $\frac{3}{4}$ of an inch and wedging it with cast lead wedges every 6 inches afterwards, pointing it with cement (no lime mortar should come in contact with lead, or the latter will be corroded).

At the eaves should be fixed 5-inch deep half-round eaves gutters of cast iron, provided with all necessary stopped ends, outlets, angles, &c., and secured to the rafters with iron straps fixed over the tilting fillet as per Fig. 105, Plate XV.

The rain-water pipes should be plain round cast-iron ones, with ears cast on, 2 to $2\frac{1}{2}$ inches diameter, and nailed to the brickwork and provided with swannecks of the proper projection, and, if emptying on to gulleys, with shoes also.

The eaves gutters, and pipes should all be of an approved Scotch make, and be painted one coat at the foundry, before rust has set in, and another coat before being fixed, allowing sufficient time for the paint to harden before the gutters, &c., are fixed.

Woodwork Generally.

In any woodwork construction particular attention should be paid to those parts most exposed to the influences of the weather, such as windows, external doors and frames, &c.

Take, for example, a window much exposed to the influences of moisture, particularly about the sill and lower parts; a little defect in the joints there may, and probably will, shorten the life of the window by one-half, since the

latter can seldom be properly repaired, which means that some sound parts such as glass and painting are wasted; and, added to this, there is the cost of taking the window out, putting in a new one, and making good to the surrounding walls. Now the difference between the value of really good, dry wood and defective stuff is not great for, say, the quantity required in a window 20 feet superficial, probably not much over a shilling, but the total cost of a new window of that size, fixed complete, will be between £2 and £3. As a contrast, we may take the case of an internal door. While it is desirable that it should be of sound, dry wood, a little defect in it has no disastrous results similar to the defective window; hence the importance of care in using good material and labour in all work which may rapidly decay owing to an original defect.

Floors.

In parlours, inch wrot grooved and tongued red flooring should be laid on joists 4×3 inches fixed not more than $13\frac{1}{2}$ inches apart, supported on half-brick sleeper walls not more than 4 feet 6 inches apart; the sleeper walls should be built honeycomb, have a damp course on the top of the lowest course, and be finished with a bond $4\frac{1}{2} \times 1\frac{1}{2}$ inches bedded on the sleeper walls; air-grates should be inserted in the external walls round ground-floor timbers, and so arranged that good ventilation is obtained, and, where necessary, a pipe should be fixed from the parlour under the living-room floor to the opposite external wall, where an air-grate should be fixed in order to secure a through draught.

Bedroom floors should be similar, and have joists of the following sizes:—

| | | | | Inches. |
|-------|--------|------------|-------------------|---|
| Up to | 5 feet | clear span | between bearings, | joists should be $4\frac{1}{2} \times 2\frac{1}{4}$ |
| „ | 8 | „ | „ | „ $6 \times 2\frac{1}{2}$ |
| „ | 10 | „ | „ | „ $7 \times 2\frac{1}{2}$ |
| „ | 12 | „ | „ | „ $7 \times 2\frac{1}{2}$ |
| „ | 14 | „ | „ | „ 9×2 |

with a row of $1\frac{1}{4} \times 1\frac{1}{4}$ inch herring-bone strutting in the two last cases.

Joists should have at least $4\frac{1}{2}$ inches bearing at each end, and be fixed the narrowest way of a room.

Windows.

Sashes, double hung, are the best form of window for cottages; they are far better than casement windows for the purposes of *ventilation*, being easily opened and closed, and they can be left slightly open, when a casement would have to be closed.

For cottages the sashes should be divided into squares from 8×10 inches to $9\frac{1}{2} \times 11$ inches with inch bars and 2-inch meeting rails, the lower sash being 3 squares high and the upper one 2, as shown in the various elevations, and when a single window is required over 4 squares wide it should have two pairs of narrow sashes divided by a mullion, as is shown in most of the living rooms; and in this case one pair only need be hung, avoiding the necessity of a wide mullion in the centre of the window.

Particular attention should be paid to the sill, which should be of oak and be throated, double sunk, and fitted with a weather bar, as shown by Fig. 98, Plate XV. This method of construction is inexpensive and effectually prevents any moisture penetrating the wall below the sill, and at the same time preserves the sill from the damaging influence of moisture which occurs when the wood sill fits flat on the stone sill right up to its external face.

Figs. 99-100 show sections of a transomed casement window fitted with weather-proof beads and fillets, the only form of wood casement which is capable of excluding the wind and rain. These casements with transomes look exceedingly well, perhaps better than sashes, but they cost more than the latter, with the drawback that they are not so good for purposes of ventilation; casements in large, single squares without transomes, of course, are cheaper, but are very ugly in appearance.

On the other hand, sashes may be made to look well in cottages if kept to moderate proportions, with squares of glass as before suggested, avoiding such proportions as are only adapted to a gentleman's residence.

Doors.

External entrance doors to cottages should be 2-inch framed ledged ones, filled in with narrow, grooved tongued and both sides V-jointed boarding; they should be hung to frames fitted with cast-iron shoes at the foot, as shown in Fig. 121, Plate XVII. All wood, more especially fir, readily absorbs moisture at the end of the grain, and a door-frame standing on a stone threshold where water often lodges will quickly absorb moisture which passes several inches up the frame, and as the latter is generally painted on all sides save the end the moisture has very little chance of being dried out, hence the lower end soon rots. It was finding this early and constant rotting of doorposts, at least thirty years ago, which led me to adopt the cast-iron shoe, which effectively prevents the evils described above.

Coalhouse doors may be inch ledged and braced ones hung with iron strap hinges and hooks let into stone, as shown in Fig. 116, Plate XVII.

Internal doors may be five- or six-panelled ones, the framing being $1\frac{1}{2}$ inches thick and chamfered on the top edges of the middle and bottom rails

only; such a door costs very little more than a good plain ledged door and is far superior to the latter in utility and appearance.

All ironmongery on doors, &c., should be of a plain, strong pattern, iron handles and latches being used and no rim latches, &c., for the knobs to drop off and become useless.

Plastering.

Good sound laths should be used for all partitions and ceilings, and care should be taken that plenty of long ox-hair and not too much sand be used, the amount of the latter permissible depending on the composition of the lime.

A flush beaded cement skirting 6 inches deep should be run round the scullery walls at floor level.

Painting.

Genuine white lead and linseed oil should form the basis of all paint; all knots should be carefully dressed before priming, and the stopping be done with good oil putty after the first coat, and all paint should be well brushed in.

The eaves gutters should have two coats after being fixed, and all wood-work three coats after priming.

It should be noted that in *repainting* old buildings externally special care should be exercised in thoroughly cleaning from all painted surfaces *all dirt, rust, cracked or blistered paint, and loose putty, carefully stopping all defects after the first coat of paint*; the preservation of wood and iron depends on this being properly done.

Privies and Ashpits.

The essential points to be observed in the construction of these are:—

(a) They should be kept dry and rendered thoroughly impervious, so that the deposits in them cannot become saturated with water from outside nor percolate into the surrounding ground.

(b) The ashpit floor should not be less than 3 inches above the ground outside which helps to prevent the evils mentioned above.

(c) Both closet and ashpit should be well ventilated.

To render the walls and floors impervious they should be lined with blue bricks set in cement up to the level of the closet seat, the floor paving being laid on cement concrete. The method of constructing the seat, &c., is clearly shown in Figs. 67–70, Plate XI. At the front is a York or other hard self-faced stone fixed behind a brick step 9 × 9 inches, the object of which is to give extra depth to the ashpit and still keep the floor of the latter above-

ground; the closet door should be a $\frac{3}{4}$ -inch ledged one and be shorter than the height of the doorway, allowing of open spaces top and bottom for ventilation, and the whole should be roofed with flat tiles, &c., as before described, except that the eaves and gables need not project to the same extent.

SPECIAL POINTS IN THE CONSTRUCTION OF BUILDINGS FOR SMALL HOLDINGS.

The general principles are practically the same as already described, but there are a few special points requiring description.

Pavings.

All pavings should be laid on a bed of hard, dry material, with just sufficient fall to carry off the urine, &c., to the desired outlet.

All the buildings, except the covered yards, manure pits, and a portion of the cow-stalls, should be paved with stocks specially selected for hardness set on edge and bedded and grouted with lime. The floors of the cow-stalls for a distance of 2 feet 6 inches at least from the mangers should be paved with good tough clay. Cattle go down on their knees first and rise hind quarters first, consequently if the end of the stall next the manger were paved with bricks or other hard material the cow's knees would soon be injured. Fig. 114, Plate XVII., is a sectional elevation of the floor of a cow-stall and manger, showing the necessary division where there are more than two cows. There is a sunk dung channel from 6 feet to 6 feet 6 inches from the mangers, the exact length depending on the class of cattle likely to be kept; a small cow would require the channel to be not more than 6 feet from the manger, whilst a larger cow would require 6 feet 6 inches, the point being that a cow at rest or with her head in the manger should have her hind feet within 2 or 3 inches of the channel, otherwise the dung will drop in the stall instead of the channel, and the cow will lie down in it if the standing be too long; if, on the other hand, it be too short the cow will stand with her feet in the channel, in which position she would be most uncomfortable, and in either case will become very filthy. The channel should be 14 inches wide and be about 4 to 5 inches deep next the cows and fall $\frac{1}{2}$ inch outwards, the channel falling in its length to an outlet to carry away the urine; any such outlet through a wall should be by means of a glazed pipe built into the wall projecting a little beyond the face of the wall so as to deliver the liquid clear of the latter.

The covered yards, whether for dung or cattle, should be paved with cement concrete, rammed solid 5 inches thick, and sloped up all round, forming a kind of dish.

Mangers and Partitions.

For cattle tied by the neck the mangers should be about 15 inches high above the paving immediately in front to the top of the manger; if they are any higher beasts tied by the neck could not rise after lying down, as they lie with their heads over the mangers; for horses or loose cattle the mangers should be about 3 feet to 3 feet 3 inches high and be formed of brick piers and arches, all angles of which should be bullnosed; low mangers must of course be built solid without arches; the manger itself should be formed of glazed earthenware semicircular channels, without sockets, 15 inches diameter inside, and bedded on concrete filled in between the brick sides, the ends being rounded in the concrete and finished with a trowelled face in cement, *care being taken that no angles are formed where food can accumulate and decompose*, as often happens in old mangers having angles in them.

On all sides not up to walls the brickwork of the mangers should be finished with an oak cap chamfered on the upper edges, as shown in Figs. 113 and 114, Plate XVII.

The stall divisions between the pairs of cows should extend from over the manger to 3 feet 6 inches back from the manger front, terminating with an oak post not more than 3 feet high, so that a cow when loosed may turn her head over the end of the partition, facilitating her turning round, but next the manger the partition should be about 4 feet 6 inches high, to prevent cows fighting over it.

There should be a sloping board on the manger eap $11 \times 1\frac{1}{4}$ inches, next the food store to facilitate putting foods such as cake, chaff, and meal into the mangers, with two rails above, halved on to the post at the head of the stall division.

All edges should be chamfered and not left square.

Windows.

There should be sufficient windows for light and ventilation in all closed buildings occupied by live stock, dark, badly ventilated places being very injurious to the animals kept in them.

Figs. 122 and 123, Plate XVII., show a form of window which is both the most satisfactory and least expensive to use in all buildings where live stock are fastened up, or the window can be fixed in a gable and other places out of reach of animals loose. This form of window consists of a cheap sliding easement running in two grooved battens bolted to the wall; it can be entirely closed or opened to any desired amount up to the full width of the opening, and, being fitted with rollers, is easily worked. This window is most efficient and therewithal cheap, and does not cost more than one-half the amount of

the old-fashioned hit-and-miss pattern, and yet gives twice the amount of light and ventilation, and will last at least three times as long.

There may be a few cases where a window to open on hinges may be more suitable, and for such cases the window shown by Figs. 124 and 125, which has a casement hinged at the bottom and opening inwards may be used.

Doors and Frames.

The doorways for places in which horses and cows are kept should be about 3 feet 3 inches to 3 feet 6 inches wide in the clear \times 6 feet 9 inches to 7 feet high, and other doorways about 3 feet wide. The doors for the former should be 2-inch framed, ledged, and braced doors hung in two heights, being divided about 3 feet 9 inches high, as shown in Fig. 119, Plate XVII.

Other doors should be strong ledged and braced ones, shown in Fig. 115.

The heavy doors should be hung to frames $4 \times 4\frac{1}{2}$ or $5\frac{1}{2}$ inches, rebated, chamfered, and fitted with iron shoes as previously described, the shoes being dowed to stones $9 \times 9 \times 6\frac{1}{2}$ inches, the space between the stones being filled in with bricks set on edge in cement.

All edges of the framing, rails, or braces should be chamfered or splayed as indicated in Figs. 117 and 118, Plate XVII., so that when standing open all wet will be thrown off the rails, &c.

The doors should be hung with strong blacksmith-made wrought-iron strap hinges extending right across the doors and secured to them with bolts, not merely with screws or nails. The latches also should be bolted to the doors. The hooks for hanging the doors on should be bolted through the frames where there are frames in the manner shown in Fig. 120, Plate XVII., or where there are no frames the hooks should be let into stones and run with lead, as shown in Fig. 116.

The catches should be secured in a similar manner, and where live stock use the door there should be side guards on the catches to prevent injury to the live stock, as shown in Fig. 119, Plate XVII.

Ventilation.

Although doors and windows afford excellent means of ventilation, some provision is necessary for the occasions when they may be shut. Ventilating tile-ridges will form outlets if fixed in the right places, and for inlets air-grates close to the floor at the back of the mangers should be inserted in the external walls; *fresh air* will by this means be continually passing to the *cow's heads*, where it is most needed, and the warm, foul air passing out at the roof. These air-grates should be of iron, and have one on the interior of the wall to slide.

Roofs.

The roofs over manure pits should be galvanised corrugated iron sheets. Where the piggeries and manure pits are roofed in together with this the former should first be covered with inch boarding for the better equalising of the temperature.

Roofs over yards for *live stock* should be of creosoted boards specially prepared for the purpose. Figs. 106-110, Plate XVI., are constructional details of these roofs.

Fig. 106 is an elevation of the truss for the yard to the set of buildings on Plate XIV., and Fig. 107 is an enlarged section showing the method of carrying the trusses. The pillars should be built in cement, and the ends of the trusses held down to them by long anchor-bolts built into the walls below.

Figs. 108, 109, and 110 are applicable to all such roofs, and show the methods of securing the boards to the purlins and beams. Fig. 108 shows the ridge, a single timber here being preferable to two purlins. Fig. 110 is a section showing the method of securing the boards. A couple of hobnails are fixed to the purlins near the edge of each board, the latter being supported on the heads of the nails and thus kept clear of the purlin, leaving no place where water can lodge. The boards are then nailed to the purlins with long wire nails. A section of the boards themselves is shown in Fig. 109. They are fixed about $\frac{1}{8}$ to $\frac{3}{16}$ of an inch apart, which space has the effect of preserving the boards, and is not large enough to allow any appreciable amount of wet to pass through. Each board is grooved along the side to carry water off quickly. The point to remember in fixing these boards is, that as little surface as possible should be in contact with another surface where moisture may lodge and cause decay.

I have indicated that the best and most economical materials to use in the construction of cottages and of buildings for live stock are bricks and tiles when available, or stone and tiles, and for covered yards open creosoted boarded roofs, and for manure pit roofs of galvanised corrugated iron are the cheapest and best materials.

At the time I was writing my work on "Modern Homesteads" great prominence was being given in the press and at public meetings to the theory that *cheaper* and better material might be found for building purposes than bricks, stone, tiles, and slates, the exhibition of *cheap* cottages at Letchworth being the outcome of this. In that work I strongly urged that bricks, stone, and tiles *are by far the best and most economical materials* to use for such

buildings, and I warned the inexperienced not to be led away by specious advertisements. That warning has been amply justified by the exhibition itself, which, ostensibly promoted to demonstrate that *buildings might be made cheaper by using some other material*, ended in proving one point only, viz., that *bricks and tiles are, after all, the cheapest as well as the best materials to use in building cottages*—a fact which all experienced architects and builders already knew.

CHAPTER VI

RURAL BYELAWS AND THE PRESENT COST OF BUILDING

THE byelaws in force at the present time as to buildings in rural districts are by some people believed to be the cause of the increased cost of building, and others go so far as to assert that these byelaws actually *prevent* the much-needed rural cottages being built, and as a result of these arguments an agitation has been started with the object of securing much less stringent regulations as to buildings in rural districts. It therefore seems necessary, in a work treating of such buildings, to examine whether there are any real grounds for this agitation, and what the results would be if its avowed objects were achieved.

Below I give a table of the rural districts in England and Wales, taken from a Parliamentary Return of July 31, 1905 :—

BYELAWS IN RURAL DISTRICTS.

| Number of Rural Districts. | Districts with no Byelaws in force. | Districts with Byelaws in force. | | | | | |
|-------------------------------------|--|--|----------------------|--|----------------------|--|----------------------|
| | | Urban Model Series substantially followed. | | Rural Model Series substantially followed. | | Not following either Model Series. | |
| | | Whole District. | Part of District. | Whole District. | Part of District. | Whole District. | Part of District. |
| 668 | 246 | 169 | 114 | 106 | 32 | 11 | 6 |

From which it will be seen that the total number of rural districts is 668. Of these, 246 districts have no byelaws at all in force, and in 169 whole districts and in parts of 114 others, the Local Government Board's Model Urban Byelaws are in force ; the fifth and six columns show that there are 106 whole districts and parts of 32 others in which the Model Rural Byelaws have been adopted,

whilst the last two columns show there are 17 districts in which the byelaws do not follow any model.

Now if there is the least foundation for the assertion that these various byelaws *prevent the old dilapidated, insanitary cottages* being replaced with good healthy new ones, we ought to find that in the 246 rural districts *without any byelaws whatever new cottages abound*. But what do we find in these *non-byelaw districts, e.g.*, in parts of Lincolnshire, Norfolk, Dorset, and other counties? Just the reverse, viz., a very large proportion of the rotten old hovels still in existence, with fewer new cottages than in the districts having byelaws; and it must not be inferred from this that the byelaws have compelled the demolition of the old cottages and new ones to be erected in their stead in districts having byelaws (at least, not to any great extent); on the other hand, it is generally the rapid increase in the buildings in a district that *necessitates* the imposition of byelaws more or less stringent, whilst in districts where perhaps but one new house may be erected in the year, no one troubles about byelaws, for they are not wanted, and certainly *do not prevent* the erection of buildings, which at once shows the ignorance of the agitators on the subject.

To the Model Rural Byelaws there cannot, in my opinion, be the slightest objection, and the man who wants to build in a cheaper form than these allow is very ignorant as regards his own interests, and may even be worse than that as regards the interests of the people using his buildings.

With regard to the Model Urban Byelaws, these require nothing but sound, healthy dwellings such as I designed and carried out before even the Public Health Act, 1875, came into force, and such as ought to be built whether there are byelaws or no byelaws. The only part of this series of byelaws to which I take exception is the requirement that the party wall between two rural cottages shall be 9 inches thick; a half-brick wall, well and solidly built and plastered both sides, is quite sufficient in cottages where the walls are only a few feet long, and mostly strengthened by chimney breasts; the extra half-brick is waste in such cases, and as a half-brick wall *would pass in over 400 rural districts*, I have shown them in the series of plans, and the quantities have been based accordingly. Where, however, the byelaws require a one-brick wall, the extra cost would be about £1 10s. to £2 10s. per cottage, according to size and arrangement—a small sum certainly, but too much to spend where it cannot increase the value of the cottage one penny to either owner or occupier.

There may be in a few rural districts where *urban byelaws* are in force some little stupid conditions, having their origin in the ignorance of the framers, who are gentlemen, as a rule, who do not understand the theory and practice of building, assisted by their surveyor, who may be an excellent man in many ways but who has seldom had much experience in building operations, save

perhaps municipal and other works of a public character, and it would be a useful and desirable condition to impose on rural councils *adopting urban powers* that when framing their byelaws they should have the assistance of either one or two architects of recognised experience and repute in rural building works as an almost certain means of eliminating any trifling, vexatious, and useless requirements.

To my mind there is nothing to warrant the extravagant talk about *iniquitous byelaws* in rural districts, of which we have heard so much lately, and one of the most lamentable episodes in this agitation was the exception that one of His Majesty's judges took to that very reasonable requirement of most byelaws that before any buildings are commenced proper plans shall be submitted to the council of the district. There is no hardship in complying with this byelaw, for any intelligent foreman or builder can readily, and often does, prepare the necessary drawings, which need not in any sense be elaborate. But there is a difference between a properly drawn plan and a sheet of paper having a few splashes of the pen, with perhaps some notes scribbled upon it—a form of plan which no man in the world could pretend to understand, and certainly such as no council could reasonably accept, otherwise it would be just as well to dissolve all local authorities who are charged with the care of the public health; for how can they discharge their duties in this respect with regard to buildings if they do not know beforehand what a man proposes to build? There are, no doubt, many rules of procedure in the courts of law of this country far more irksome, and involving much more expense to litigants than this byelaw as to plans, and which are necessary for the due administration of justice. And what would the judges say to litigants who set all the rules of procedure at defiance, and walked into the courts some morning, demanding to have their cause tried without complying with the formal preliminaries of serving a writ, delivering pleadings, &c., simply stating that such procedure was *expensive and troublesome*, and that they would not comply with it? The idea is absurd, and it is astonishing that one of His Majesty's judges should have adopted a course of defying a council's reasonable requirements—a course which he would be bound to condemn with regard to his own court.

In this agitation against byelaws we have one of the most illogical state of things it is possible to imagine, viz., a great outcry as to the *insanitary and unhealthy* condition of a large proportion of the rural cottages of this country (a condition of things supported by most conclusive evidence) with a demand that *this state of things* be remedied by the modification of byelaws, so that it shall be quite easy for the old insanitary dwellings to be replaced by others of *precisely the same class*, or, in other words, that we shall return to the conditions prior to 1875, when a man built as seemed right or convenient in

his own eyes—a time when there were usually *two holes near a cottage, one the cesspool for drainage from the cottage, and the privy* and the other, not far from the first, *a shallow well supplying drinking water for use in the cottage.* At the present time even, many houses are erected which can only be described as *unhealthy*, and to restrict the operation of byelaws would lead to the multiplication of such dwellings.

I do not wish the reader to imagine that I hold a brief for rural councils and their byelaws, for I do not; I am not a surveyor to any council, and never have been, nor have I ever been a member of any such body; but I have had a very long experience of building operations carried out in over forty different local authorities' districts, and my unbiassed opinion is that the *cost* of building in rural districts is *not really seriously affected* by the present byelaws.

What, then, is the cause of the increased cost of building, amounting to as much as 60 to 80 per cent. during the last forty years? It is undoubtedly the increased cost of the labour involved in building operations.

The value of the raw material in a building, say a pair of cottages, is very small indeed (except in the case of rough timber) as compared with the cost of the finished building.

Of the materials used, bricks, tiles, lime, and cement, form a very large percentage, and in most of these the value of the raw material used in their production would not amount to 10 per cent. of the value of the finished product; for example, in the case of 1,000 bricks costing say 25s. delivered on the site of the building, 15s. to 20s. will be spent (in labour) in laying them in position, making a total cost of 40s. to 45s. on the 1,000, and the value of the raw material for them would not exceed 2s. 6d., or about 5 per cent. of the total cost in the building. The same proportions apply to almost the whole of the materials other than woodwork, and even in the cost of that a *very large percentage* goes in labour.

This increased cost of labour has arisen from two causes, viz., (1) the great increase in wages paid to workmen during the last half-century, and (2) the greatly reduced amount of labour performed in a day by all classes of workmen engaged in the building trades.

I think no one will wish to gainsay that all workmen should be paid a good day's wage for a good day's work, but it is unpleasant to have to state that the day's work of a great number of men engaged in the building trades is not only very meagre but also of inferior quality, and this state of things is largely due to the abolition of the apprenticeship system and the introduction of trades unions; and it is to be feared that to the latter is due to a great extent the deterioration of the workmen of the present day.

Fifty years ago there were in every branch of the building trade a large percentage of first-class workmen, but now this percentage has very considerably dwindled, and constitutes one of the great difficulties in the way of getting good work executed at a moderate cost, and which indeed can only be achieved by *eliminating* every scrap of absolutely non-essential labour.

Trades unions have doubtless conferred great benefits on their members, but at the same time they have to a large extent lowered the quality of them by fixing a *uniform* rate of wages which is grossly unfair to the best workmen. Most people are aware that some inducement is required to develop the best qualities of most men, and especially that of youths; but what inducement is there under the trades unions uniform rates of wages? A youth commencing in one of the branches of the building trade begins with the idea that his wages will ultimately be the same whether he be a good or an indifferent workman, and he has not the slightest inducement to make himself *thoroughly proficient* in his particular trade, resulting, in a large proportion of cases, in him becoming a second- or third-rate workman, and as such invariably expensive to employ.

It is to these causes must be ascribed the increased cost of building works *and not to byelaws*, especially in those districts which have none in force.

Seeing that a very large percentage of the total cost of a cottage is incurred in paying the various workmen in manufacturing the materials and putting them together, it is a little illogical that working men should so loudly complain as to its cost, and object to pay a reasonable rate of interest on the latter for the increase in which they are mainly responsible.

In this connection, it is rather unfortunate for working men themselves that the majority of writers and public speakers on this subject are, or hope to become, members of Parliament or of other public bodies, and as such are largely dependent on the working men's votes, the result being that they ignore or misrepresent the latter's share in the increased difficulty in providing good cottages at a moderate rent; and it is refreshing to hear the Right Honourable John Burns, M.P., telling working men that if they spent less on injurious and unnecessary objects, they would be better able to pay a fair rent for a decent cottage.

SCHEDULES OF PRICES.

Variation in the Cost of Building.

The variations which one frequently finds in the cost of building works are caused by three things, viz., (i.) the state of the building trade; (ii.) the distance which the heavy materials have to be conveyed by road or rail; and (iii.) the presence of suitable builders in the immediate neighbourhood of the building.

A combination of very good trade with the necessity of conveying the materials long distances, especially by hilly roads, and of employing men at a considerable distance from their usual place of work may increase the cost of a building $12\frac{1}{2}$ to $17\frac{1}{2}$ per cent. over the cost of the same building in another district where heavy materials are close to hand, builders are on the spot and the trade is in a normal state.

Knowing by experience that these variations in cost are constantly occurring, I have considered it *essential*, in order to make this work thoroughly reliable and useful, to include *schedules of prices* for both cottages and buildings on which the estimated cost of each of the designs illustrated have been based, so that any builder or clerk of works will be able to see at a glance whether the prices are applicable to his particular district or not, and if not, then how much must be added to or deducted from them: and if it should be found that the prices in the schedule, say for brickwork or tiling, are not enough, and that brickwork costs in any particular district 5s. per superficial yard, and tiling 42s. per square, the extra cost should be added to these items, and if it is then found that the total cost of any particular cottage or block of buildings is increased $2\frac{1}{2}$ per cent. thereby, *the same rate of increase may be taken as applicable to the cost of other cottages or buildings*, illustrated as the case may be. I may say the prices given are the *average prices* for work which has actually been carried out by me during the past few years when the building trade was normal, and that neither *the lowest nor the highest prices* have been adopted, but the average prices for half a dozen such buildings.

Water Supply.

Whilst it is possible to form a fairly accurate estimate of the cost of cottages and other buildings when based on the actual quantities for the work, it is not possible to form a reliable estimate of the cost of providing a water supply to them, and it would be useless to attempt to do so, as in some cases there might be already a supply on the site or there might be a water company's main running through the village, in each of which cases the cost would be almost nil; but there might be also other cases where a well would have to be sunk or a rain-water cistern and pump provided, and the probable cost of these could only be arrived at with a full knowledge of all the circumstances of each case, and for these reasons no attempt is made to include the cost of water supply.

Bills of Quantities.

The system adopted in taking off for billing and pricing these is one which has been followed for a number of years in my office, as being one which

experience has shown to be readily understood by builders in all parts of the country, especially in rural districts, and as tending to the uniformity of estimating; consequently the bill is not overloaded with items, which the majority of builders *never price*, or if they do so the price is generally out of all proportion to the real value, being mostly in excess of such value, which does not tend to decrease in cost of buildings; for example, manufacturers do not charge anything extra for *tile and half-tiles* over the price of ordinary tiles per square, and if the former are measured *as extra* on the tiling, any price put to the item by the builder is all profit to him, for he pays the manufacturer *nothing extra*.

The quantities have been taken off strictly net, and do not allow of any waste on the builder's part.

The reader should bear in mind what I have said as to the use of the word "best" in a specification and in the bills following, the best of some *particular manufacturers* is meant, but for obvious reasons I have not mentioned any manufacturer in particular.

SCHEDULE OF RENTS FOR COTTAGES.

| No. of Plate. | Figures. | Description of Cottages. | Cost | Cubic Feet in Cottages. | Cost per | Cubic Space in Bedrooms of each Cottage. | Total Cost | Annual Rent per Cottage to return 4 per cent. on Outlay. |
|---------------|----------|------------------------------------|-----------------------|-------------------------|-----------------------------------|--|--|--|
| | | | Exclusive of Privies. | | Cubic Foot in Pence and Decimals. | | ready for Occupation excluding Water Supply. | |
| | | | £ s. d. | | | | £ s. d. | £ s. d. |
| II. | 7-12 | Pair for labourers | 286 6 5 | 12,608 | 5.45 | 1,943 | 308 19 4 | 6 3 7 |
| III. | 13-18 | Ditto | 285 6 1 | 12,480 | 5.48 | 1,809 | 307 19 0 | 6 3 2 |
| IV. | 19-24 | Ditto | 303 8 3 | 13,512 | 5.38 | 1,983 | 326 1 2 | 6 10 5 |
| V. | 25-30 | Ditto | 318 13 5 | 14,757 | 5.18 | 2,275 | 341 6 4 | 6 16 8 |
| VI. | 31-36 | Pair for workmen | 381 4 6 | 18,732 | 4.88 | 2,889 | 403 17 5 | 8 1 7 |
| VII. | 37-42 | Ditto | 405 3 6 | 19,411 | 5.00 | 3,186 | 427 16 5 | 8 11 2 |
| VIII. | 43-48 | { Detached for labourer } | 173 12 11 | 7,125 | 5.84 | 2,220 | 188 5 | 7 10 5 |
| „ | 49-51 | { For small holding, 6-12 acres } | 182 3 2 | 7,733 | 5.65 | 2,580 | 196 15 6 | 7 17 7 |
| IX. | 52-54 | { Detached for workmen } | 231 19 2 | 10,145 | 5.48 | 3,272 | 246 11 6 | 9 17 3 |
| „ | 55-60 | { For small holding, 15-25 acres } | 256 3 4 | 11,262 | 5.45 | 3,807 | 270 15 8 | 10 16 7 |
| X. | 61-66 | { For small holding, 30-45 acres } | 237 17 8 | 13,231 | 5.22 | 4,058 | 302 10 0 | 12 2 0 |

NOTE.—The cube of the cottages is taken from 8 inches below the ground floor and does not include to bottom of the foundations.

SCHEDULE OF RENTS FOR BUILDINGS.

| No. of Plate. | Figures. | Description of Buildings. | Cost exclusive of | Cost Per | Cost of Covered Yards and Manure Pits. | Total Cost | Annual Rent to return 4 per cent. on Outlay. |
|---------------|----------|----------------------------------|--------------------------------|-----------------------------------|--|---------------------------------------|--|
| | | | Covered Yards and Manure Pits. | Cubic Foot in Pence and Decimals. | | ready for use excluding Water Supply. | |
| | | | £ s. d. | | | | £ s. d. |
| XI. | 71-77 | { For holding } { 5-8 acres } | 62 11 7 | 5.45 | £ s. d. 11 1 7 | £ s. d. 73 13 2 | £ s. d. 2 18 10 |
| XII. | 78-81 | 10-15 acres | 94 0 10 | 4.67 | 12 5 0 | 106 5 10 | 4 4 9 |
| „ | 82-85 | 15-24 acres | 121 5 11 | 4.16 | 37 7 3 | 158 13 2 | 6 7 0 |
| XIII. | 86-88 | 18-24 acres | 144 18 7 | 3.72 | 12 11 11 | 157 10 6 | 6 6 0 |
| „ | 89-91 | 20-27 acres | 146 16 6 | 3.53 | 30 9 3 | 177 5 9 | 7 1 7 |
| XIV. | 92-96 | 35-45 acres | 357 18 7 | 4.15 | 40 2 0 | 398 0 7 | 16 0 0 |

NOTE.—For calculating the cost per cubic foot the measurements have been taken to 8 inches below the floors.

BILL OF QUANTITIES AND SCHEDULE OF PRICES FOR THE PAIR OF COTTAGES ILLUSTRATED ON PLATE V., FIGS. 25-30.

EXCAVATOR AND DRAINS.

| Yards. | Feet. | | | £ | s. | d. |
|--------|-------|-------|--|-----|----|------|
| 19 | | cube | Excavate surface trenches for foundations, part fill in and ram and spread remainder as directed | 1/6 | 1 | 8 6 |
| 100 | | supl. | Excavate surface soil on site of buildings and paved yards an average of 6 inches deep and spread as directed | -/2 | 0 | 16 8 |
| 74 | | " | Hard dry brick or stone rubbish spread 4 inches thick and levelled and rammed solid under all pavings ... | -/4 | 1 | 4 8 |

Drains.

N.B.—A sufficient length of drains has been taken to carry away all rain-water clear of the buildings and the sewage to a cesspool 50 feet from the houses (*vide* Model Rural Byelaws).

| Yards. | Feet. | | | £ | s. | d. |
|--------|-------|-------|--|------|-----|------|
| | 144 | run | 4-inch drain of best quality salt-glazed earthenware socketed pipes with Portland cement joints laid in trenches average 2 feet deep, including digging, filling in, and ramming... .. | -/6 | 3 | 12 0 |
| | | | No. 10 extra for 4-inch bends | 1/- | 0 | 10 0 |
| | | | No. 7 extra for 4-inch junctions | 1/6 | 0 | 10 6 |
| | | | No. 1 extra for 4-inch syphon trap | 3/6 | 0 | 3 6 |
| | | | No. 2 6-inch glazed earthenware gulleys with channels and galvanised iron gratings, 4-inch outlets, and including digging, bedding on concrete, and connecting with drain | 9/6 | 0 | 19 0 |
| | | | No. 1 Galvanised iron circular grating, ½-inch metal × 5-inch diameter... .. | 1/- | 0 | 1 0 |
| | | | <i>Build Cesspool as follows:—</i> | | | |
| 4 | 15 | cube | Excavate, &c., as before described | 1/6 | 0 | 6 0 |
| | | " | Cement concrete composed of four parts (by measure) of gravel to one part of sand and one part of Portland cement, rammed solid | -/6 | 0 | 7 6 |
| 5 | 6 | supl. | Stock brickwork one brick thick in lime mortar ... | 4/- | 1 | 0 0 |
| 5 | 6 | " | Rendering with Portland cement sides and bottom of cesspool | 1/6 | 0 | 8 4 |
| | | | No. 2 Cut holes in one-brick wall for 4-inch drain pipes and make good about same | -/6 | 0 | 1 0 |
| | | | No. 1 Cast iron air-tight manhole cover and frame, 18 inches × 18 inches, in the clear p.c., 7s. 6d., and add carriage, fixing in cement, and profit | 10/- | 0 | 10 0 |
| | | | Carried to Summary | | £11 | 18 8 |

BRICKLAYER.

The *Stock Bricks* to be hard-burnt square ones, those showing on the external faces of walls being specially selected free from chipped edges and of an uniform colour.

The *Pressed Bricks* to be as follows: Blue bricks to be the best quality Staffordshire. Red bricks to be from a local maker, hard-burnt, square, free from chipped edges, and of an uniform colour.

The *Paving Bricks* to be the best quality blue Staffordshire bricks.

The *Paving Quarries* to be the best pressed blue and red Staffordshire or Welsh quarries.

The *Lime Mortar* to be composed of freshly burnt local lime and clean sharp sand mixed in equal proportions.

The *Cement* to be the best quality Portland of an approved make, and to be mixed with an equal quantity of clean sharp sand.

The *Brickwork* generally to be pointed on all exposed faces with a neat flat struck joint as the work proceeds; four courses not to rise over $1\frac{1}{4}$ inches more than the same bricks set up dry, and the whole to be flushed up solid with mortar every course.

| Yards. | Feet. | | | | £ | s. | d. |
|--------|-------|-------|--|------|----|----|----|
| 375 | | supl. | Stock brickwork in lime mortar in one-brick and half-brick walls reduced to one brick thick... .. | 4/4 | 81 | 5 | 0 |
| 56 | | " | Extra on the stock brickwork for pointed face (coal-houses and larder) | -/4 | 0 | 18 | 8 |
| 252 | | " | Ditto for selected stock brick facing and pointing one face, including:—... .. | -/6 | 6 | 6 | 0 |
| | | | 53 feet run bullnose angles | -/1 | 0 | 4 | 5 |
| | | | 30 feet run fair cut skewbacks to arches | -/2 | 0 | 5 | 0 |
| | | | 59 feet run fair circular cutting | -/2 | 0 | 9 | 9 |
| 6 | | " | Ditto for pressed red brick facing pointed one face (living-room fireplace), including:— | 1/9 | 0 | 10 | 6 |
| | | | 17 feet run bullnose angles | -/1 | 0 | 1 | 5 |
| 8 | | " | Ditto for arches of stock bricks in two half-brick rings set in cement mortar | 1/6 | 0 | 12 | 0 |
| | 52 | run | Ditto for pressed red plinth bricks set in cement mortar No. 16 returned angles | -/2 | 0 | 8 | 8 |
| | 13 | " | Ditto for pressed blue ditto... .. | -/2 | 0 | 2 | 8 |
| 4 | | supl. | Paving (in coalhouse) of hard stock bricks set on edge and grouted with hot lime | -/3 | 0 | 3 | 3 |
| 5 | 6 | " | Yard paving of $1\frac{1}{2}$ -inch blue chequered pavours bedded and jointed with lime mortar | 2/8 | 0 | 10 | 8 |
| | | | Extra for 24 feet run brick-on-edge kerb... .. | 4/- | 1 | 2 | 8 |
| 19 | | " | Paving (scullery and larder) of 6-inch \times 6-inch \times $\frac{3}{4}$ -inch blue quarries laid to break joint in cement | -/2 | 0 | 4 | 0 |
| 45 | | " | Ditto (elsewhere) of 6-inch \times 6-inch \times $\frac{3}{4}$ -inch red quarries ditto | 3/6 | 3 | 6 | 6 |
| 64 | | " | Cement screed $\frac{3}{4}$ inch thick under all quarry paving, left to harden before any quarries are laid | 3/9 | 8 | 8 | 9 |
| | 117 | " | Damp-proof course of a double course of sound slates laid to break joint and bedded in cement (measured net), or of blue bricks instead of slates (see next Bill) | -/9 | 2 | 8 | 0 |
| | 25 | run | Rake out and point lead flashings with cement... .. | -/3 | 1 | 9 | 3 |
| 148 | | " | Target and core flues | -/2 | 0 | 4 | 2 |
| 5 | | " | Thresholds one brick wide of blue header cant bricks set on edge in cement (coalhouses) | -/3 | 1 | 17 | 0 |
| | 66 | " | Labour and materials beam-filling in between feet of spars to one-brick walls \times 12 inches high (N.B.—General brickwork has been measured to top of wall plate) | -/6 | 0 | 2 | 6 |
| | 68 | " | Strong hoop-iron bond well tarred and sanded, joints lapped together and ends turned down, punched and nailed to wall plate and laying by bricklayer | -/6 | 1 | 13 | 0 |
| | | | No. 8 Terra-cotta chimney-pots set with cement, and including flaunching round same with cement | -/2 | 0 | 11 | 4 |
| | | | No. 2 Glazed stoneware kitchen sinks, 30 inches \times 18 inches \times 5 inches, and bedding in cement | 1/6 | 0 | 12 | 0 |
| | | | No. 2 Piers to sinks, 18 inches \times 24 inches \times half brick thick, of blue bricks set with cement | 10/- | 1 | 0 | 0 |
| | | | No. 4 Small half-brick trimmer arches, 24 inches \times 12 inches, in cement, and levelling up with fine concrete | -/9 | 0 | 1 | 6 |
| | | | | 1/6 | 0 | 6 | 0 |

| Yards. | Feet. | | | £ s. d. |
|--------|-------|--|--|------------|
| | | | No. 4 Set bedroom fire-grates to 15-inch openings and provide any necessary firebricks, cramps, dowels, and cement | 5/- 1 0 0 |
| | | | No. 2 Set ovens, boilers, and firebars to 3 feet 6 inch openings and provide any necessary firebricks, &c. ... | 7/6 0 15 0 |
| | | | No. 2 Set coppers and furnace works in hard stock bricks in lime mortar, connect with flue and render and float the brickwork with Portland cement ... | 20/- 2 0 0 |
| | | | No. 2 Cut holes in one-brick walls for sink waste pipes and make good about same with brick in cement ... | -/6 0 1 0 |
| | | | Carried to Summary | £119 0 8 |

MASON.

The stone to be the best of its kind, free from sandholes, vents, ironstains, and other defects, and to be laid on its quarry bed in cement.

The stone is measured net as fixed in work.

| Yards. | Feet. | | | | £ s. d. |
|--------|-------|-------|---|------|---------|
| | 35 | supl. | 2-inch sawn hearths | 1/- | 1 15 0 |
| | 17 | " | 2-inch sawn benches | 1/- | 0 17 0 |
| | 10 | run | 1½-inch × 7-inch shelf (to living-room fireplace) tooled all faces and edges... .. | 1/- | 0 10 0 |
| | | | No. 4 Rounded corners | -/3 | 0 1 0 |
| | 10 | " | 4½-inch × 10-inch frieze ditto | 1/10 | 0 18 4 |
| | | | No. 4 Rounded angles | -/3 | 0 1 0 |
| | 4 | " | 4½-inch × 6½-inch lintel, tooled all faces, splayed one edge (to copper flues) | 1/- | 0 4 0 |
| | 7½ | | 4-inch × 9-inch tooled thresholds | 1/9 | 0 13 2 |
| | | | No. 4 Mortises for dowels | -/3 | 0 1 0 |
| | 47 | " | 4½-inch × 10½-inch rubbed, sunk, weathered throated and twice-grooved window-sills | 1/10 | 4 6 2 |
| | | | No. 4 Stones 9 inches × 9 inches × 6½ inches (for hooks for coalhouse doors) tooled all faces, one angle rounded, and including letting in ironwork, lead, and running | 3/- | 0 12 0 |
| | | | Carried to Summary | | £9 18 8 |

TILER.

| Sqs. | Feet. | | | | £ s. d. |
|------|-------|-------|---|------|---------|
| 12 | 80 | supl. | Best quality flat tiling (of dark plum or strawberry colour) free from fire-cracks and other defects, and laid to a gauge of 4¼ inches on and including 1¾ inches × ¾ inches (after sawing); laths sawn out of "thirds" Gelfe timber, free from sap, and secured to the rafters with 2½-inch cut rose nails, and including full torching the under side with hair mortar or bedding in same where the tiling cannot be torched | 38/9 | 24 16 0 |
| | 50 | run | Extra for purposc made valley tiles and bedding in cement, and allow for cutting and waste to flat tiling | -/8 | 1 13 4 |
| | 96 | " | Cement filleting at gables | -/2 | 0 16 0 |
| | 63 | " | Terra-cotta-capped tile-ridge and bedding and jointing in cement | -/7 | 1 16 9 |
| | | | No. 2 Splayed mitred euds | -/6 | 0 1 0 |
| | | | No. 4 Fitted ends | -/6 | 0 2 0 |
| | | | Carried to Summary | | £29 5 1 |

PLASTERER.

The sand to be clean and sharp; the lime to be fresh and well burnt, that for the finishing coat being run a sufficient time before use to secure the best work.

The laths to be lath and half-lath, sawn out of "thirds" Gelfe timber, entirely free from sap, butted at the joints, and secured with wrot nails.

A sufficient quantity of long, dry ox-hair to be used for pricking up ceilings and partitions.

| Yards. | Feet. | | | | £ | s. | d. |
|--------|-------|-------|---|-----|-----|----|----|
| 374 | | supl. | Render float and set walls | -/9 | 14 | 0 | 6 |
| 2 | | " | Ditto circular to soffit of arch | 1/- | 0 | 2 | 0 |
| 26 | | " | Lath plaster float and set partition | 1/3 | 1 | 12 | 6 |
| 140 | | " | Ditto ceilings, part sloping | 1/4 | 9 | 6 | 8 |
| 11 | 6 | " | Ditto fluing soffit of stairs | 1/4 | 0 | 15 | 6 |
| | 55 | run | 6-inch flush beaded cement skirting (in scullery) | -8 | 1 | 16 | 8 |
| | | | No. 4 Mitres | -8 | 0 | 2 | 8 |
| | | | No. 4 Make good about firegrates after same are set | 1/- | 0 | 4 | 0 |
| | | | No. 2 Ditto about waste pipes | -/6 | 0 | 1 | 0 |
| | | | Carried to Summary | | £28 | 1 | 6 |

CARPENTER.

The timber generally for carpenter's work to be "thirds" Gefle timber or other approved and equivalent brand, selected free from sap, large, coarse knots, shakes, and other defects.

All purlins and beams to have 9-inch bearing at each end, and lintels 6-inch ditto.

The timber to be of the full dimensions given.

| Feet. | | | | | £ | s. | d. |
|------------------|-------|--|---|------------------|-----|----|----|
| | | | <i>Floor Timbers.</i> | | | | |
| 283 | run | | 2-inch × 6-inch joists | -2 $\frac{1}{4}$ | 2 | 19 | 0 |
| 33 | " | | 2 $\frac{1}{2}$ -inch × 6-inch ditto | -2 $\frac{3}{4}$ | 0 | 8 | 8 |
| 226 | " | | 2 $\frac{1}{2}$ -inch × 7-inch ditto | -3 | 2 | 16 | 6 |
| 50 | " | | 3-inch × 7-inch ditto | -3 $\frac{1}{2}$ | 0 | 14 | 7 |
| 14 | " | | 4-inch × 7-inch ditto | -5 | 0 | 5 | 10 |
| | | | <i>Roofs.</i> | | | | |
| 28 | supl. | | 1-inch gutter boards, edges shot | -/5 | 0 | 11 | 8 |
| 28 | run | | $\frac{1}{2}$ -inch × $\frac{3}{4}$ -inch tilting fillet | -/1 | 0 | 2 | 4 |
| 63 | " | | 1-inch × 5-inch ridge board | -/2 | 0 | 10 | 6 |
| 78 | " | | 1 $\frac{1}{2}$ -inch × 4 $\frac{1}{2}$ -inch splayed tilting fillet to eaves... .. . | -4 $\frac{1}{2}$ | 0 | 13 | 0 |
| 101 | " | | 1 $\frac{1}{2}$ -inch × 7-inch verge boards, wrot all round and beaded one edge | -/6 | 2 | 10 | 6 |
| | | | No. 8 Extra for returning head at foot | -/3 | 0 | 2 | 0 |
| | | | No. 4 Ditto tongued and mitred angles | -/3 | 0 | 1 | 0 |
| 101 | " | | 1-inch × 2 $\frac{1}{2}$ -inch wrought, moulded, and chamfered fillet to verge boards | -/2 | 0 | 16 | 10 |
| 438 | " | | 2 $\frac{1}{2}$ -inch × 3-inch ceiling joists nailed to common rafters and purlins | -1 $\frac{3}{4}$ | 3 | 4 | 0 |
| 1,182 | " | | 2 $\frac{1}{2}$ -inch × 3 $\frac{1}{2}$ -inch common rafters | -/2 | 9 | 17 | 0 |
| 82 | " | | 3-in. × 6-inch wall-plate | -/4 | 1 | 7 | 4 |
| 52 | " | | 3-inch × 7-inch purlin | -4 $\frac{1}{2}$ | 0 | 19 | 6 |
| 68 | " | | 3-inch × 9-inch ditto | -/5 | 1 | 8 | 4 |
| 47 | " | | 1 $\frac{1}{2}$ -inch × 9-inch valley rafter, one half wrought and stop chamfered two edges | -/4 | 0 | 15 | 8 |
| | | | No. 16 Ends of plates and purlins, reduced and wrought | -/3 | 0 | 4 | 0 |
| | | | <i>Partitions.</i> | | | | |
| 133 | run | | 2-inch × 2-inch quarters | -1 $\frac{1}{4}$ | 0 | 13 | 10 |
| 12 | " | | 2-inch × 2-inch nogging pieces (quarters measured in) | -1 $\frac{1}{4}$ | 0 | 1 | 3 |
| 28 | " | | 2-inch × 3-inch sills and heads | -1 $\frac{1}{2}$ | 0 | 3 | 6 |
| | | | <i>Sundries.</i> | | | | |
| 16 $\frac{1}{2}$ | supl. | | Centering to arches | -1 $\frac{1}{4}$ | 0 | 2 | 1 |
| 47 | run | | $\frac{1}{2}$ -inch × 4 $\frac{1}{2}$ -inch fixing fillets built in walls | -0 $\frac{3}{4}$ | 0 | 2 | 11 |
| 59 | " | | 1-inch × 3-inch turning pieces to arches | -/1 | 0 | 4 | 11 |
| 67 | " | | 3-inch × 4 $\frac{1}{2}$ lintels | -2 $\frac{3}{4}$ | 0 | 15 | 4 |
| 10 | " | | 4-inch × 4 $\frac{1}{2}$ -inch ditto | -3 $\frac{1}{2}$ | 0 | 2 | 11 |
| 13 | " | | 4 $\frac{1}{2}$ -inch × 5-inch ditto | -4 $\frac{1}{2}$ | 0 | 4 | 10 |
| | | | Carried to Summary | | £32 | 19 | 10 |

JOINER.

£ s. d.

The stuff for joiner's work generally to be "seconds" quality, Petersburg or Archangel, quite clear of any sap, very dry, and free from coarse or dead knots and other defects.

The oak to be of English growth, dry, and quite free from sap.

The sizes given are the finished sizes.

| Sqs. | Feet. | | | | | | |
|------------------------------|------------------|-------|--|--------------------|---|----|----|
| <i>Floors and Skirtings.</i> | | | | | | | |
| 6 | 6 | supl. | $\frac{7}{8}$ -inch grooved and tongued red flooring, punched, traversed, and cleaned off at completion including mitred borders to hearths... .. | 20/- | 6 | 1 | 2 |
| | 14 | run | Nosing $3\frac{1}{2}$ inches \times $\frac{7}{8}$ inch tongued to flooring including groove | -/2 | 0 | 1 | 0 |
| | 220 | " | $\frac{5}{8}$ -inch \times $3\frac{1}{2}$ -inch chamfered skirting plugged to wall ... | -/1 $\frac{3}{4}$ | 1 | 12 | 1 |
| | | | No. 34 Mitres | -/1 $\frac{1}{2}$ | 0 | 4 | 3 |
| | | | No. 24 Fitted ends | -/1 | 0 | 2 | 0 |
| | 135 | " | $\frac{5}{8}$ -inch \times $4\frac{1}{2}$ -inch ditto | -/2 $\frac{1}{2}$ | 1 | 8 | 1 |
| | | | No. 14 mitres | -/1 $\frac{1}{2}$ | 0 | 1 | 9 |
| | | | No. 24 fitted ends | -/1 | 0 | 2 | 0 |
| <i>Windows.</i> | | | | | | | |
| | 9 $\frac{3}{4}$ | supl. | Casement with solid frame, $2\frac{1}{4}$ inches \times $3\frac{1}{4}$ inches, rebated and chamfered and oak rebated, chamfered and grooved sill, and $\frac{3}{4}$ -inch chamfered bars | 1/- | 0 | 9 | 9 |
| | 111 | " | $1\frac{1}{8}$ -inch ovolo moulded sashes with $1\frac{1}{8}$ -inch meeting rails, and $\frac{3}{4}$ -inch bars in small squares, double hung to deal cased frames, with oak double sunk weathered, throated, and twice-grooved sills, with and including best quality hemp lines, brass faced axle pulleys, and iron weights for sheet glass | 1/2 | 6 | 9 | 6 |
| | 55 | " | Ditto, ditto, but mullioned in two lights, one-half only hung | 1/3 | 3 | 8 | 9 |
| | 135 | run | $\frac{5}{8}$ -inch \times $1\frac{1}{2}$ -inch moulded architrave | -/1 $\frac{1}{2}$ | 0 | 16 | 10 |
| | 40 | " | $\frac{7}{8}$ -inch \times $1\frac{1}{2}$ -inch window-board rebated and rounded, ends notched, returned and mitred | -/2 | 0 | 6 | 8 |
| | 4 | " | $\frac{7}{8}$ -inch \times 4-inch ditto | -/3 | 0 | 1 | 0 |
| <i>Doors.</i> | | | | | | | |
| | 35 $\frac{1}{2}$ | supl. | $\frac{7}{8}$ -inch ledged and braced doors, with three ledges, 7 inches \times $1\frac{1}{2}$ inches, and two braces, $4\frac{1}{2}$ inches \times $\frac{7}{8}$ inch, having all edges chamfered filled in with $\frac{7}{8}$ -inch grooved, tongued, and both sides V-jointed boarding | -/8 | 1 | 3 | 8 |
| | 35 $\frac{3}{4}$ | " | $1\frac{1}{8}$ -inch ledged doors, styles $4\frac{1}{2}$ inches \times $1\frac{1}{2}$ inches, top rails $4\frac{1}{2}$ inches \times $1\frac{1}{2}$ inches, middle and bottom rails 9 inches \times 1 inch, top part open and prepared for glass, and remainder filled in with $\frac{7}{8}$ -inch narrow grooved, tongued, and both sides V-jointed boarding | 1/2 | 2 | 1 | 8 |
| | 181 | " | $1\frac{1}{8}$ -inch six panel square framed doors, top edges of rails to be chamfered both sides | -/10 $\frac{1}{2}$ | 7 | 18 | 4 |
| | 32 | run | $\frac{7}{8}$ -inch bead | -/0 $\frac{3}{4}$ | 0 | 2 | 0 |
| | 346 | " | $\frac{7}{8}$ -inch \times 2-inch moulded architrave | -/1 $\frac{3}{4}$ | 2 | 10 | 5 |
| | 31 $\frac{1}{2}$ | " | $1\frac{3}{8}$ -inch \times $3\frac{1}{2}$ -inch rebated linings... .. | -/1 | 0 | 10 | 6 |
| | 157 | " | $1\frac{3}{8}$ -inch \times $5\frac{1}{2}$ -inch double rebated ditto | -/5 | 3 | 5 | 5 |
| | 35 $\frac{1}{2}$ | " | $2\frac{1}{8}$ -inch \times $4\frac{1}{2}$ -inch rebated and chamfered frames | -/6 $\frac{1}{2}$ | 0 | 19 | 3 |
| <i>Stairs.</i> | | | | | | | |
| | 50 | supl. | $\frac{6}{8}$ -inch risers glued and blocked to treads... .. | -/7 | 1 | 9 | 2 |
| | 25 | " | $\frac{7}{8}$ -inch treads | -/9 | 0 | 18 | 9 |
| | 31 | " | $\frac{7}{8}$ -inch cross-tongued winders measured net | -/9 | 1 | 3 | 3 |
| | 75 | run | Rounded edge to treads and winders | -/1 | 0 | 6 | 3 |
| | | | No. 20 Ends of treads and risers housed to strings | -/3 | 0 | 5 | 0 |
| | | | No. 14 Ends of winders ditto | -/3 | 0 | 3 | 6 |
| | | | No. 14 Ends of winders notched to newels | -/3 | 0 | 3 | 6 |
| | 45 | supl. | $1\frac{3}{8}$ -inch strings plugged to wall | 1/- | 2 | 5 | 0 |
| | | | No. 4 Ramps for winders | 1/- | 0 | 4 | 0 |

| Sqs. | Feet. | | | | £ | s. | d. |
|------|------------------|-------|---|-------------------|-----|----|----|
| | 11 | supl. | 1 $\frac{3}{8}$ -inch close outer string | 1/- | 0 | 11 | 0 |
| | 50 | run | Chamfered edge on string | -/1 | 0 | 4 | 2 |
| | 33 | " | Rebate in newel and string | -/1 | 0 | 2 | 9 |
| | 17 $\frac{1}{2}$ | " | $\frac{1}{2}$ -inch \times 1 $\frac{1}{2}$ -inch chamfered fillet | -/1 | 0 | 1 | 6 |
| | 9 | " | $\frac{3}{4}$ -inch \times 2-inch clapping strip | -/1 | 0 | 0 | 9 |
| | 18 | " | 2 $\frac{3}{8}$ -inch \times 2 $\frac{3}{8}$ -inch newels four times stop chamfered ... | -/9 | 0 | 13 | 6 |
| | | | No. 2 Ends, halve and belt to joists | -/6 | 0 | 2 | 0 |
| | 23 | supl. | $\frac{5}{8}$ -inch grooved, tongued, and V-jointed boarding, part formed and hung as doors | -/6 | 0 | 11 | 6 |
| | 12 | run | $\frac{3}{4}$ -inch \times 8-inch beaded apron lining | -/4 | 0 | 4 | 0 |
| | 18 | " | $\frac{3}{4}$ -inch \times 3-inch rails twice chamfered | -/3 | 0 | 4 | 6 |
| | | | No. 6 Ends of rails notched to newels | -/3 | 0 | 1 | 6 |
| | | | No. 6 Ditto cut and pin to walls | -/3 | 0 | 1 | 6 |
| | | | <i>Sundries.</i> | | | | |
| | 77 | run | $\frac{1}{4}$ -inch chamfered angle staffs | -/1 | 0 | 6 | 5 |
| | 11 | " | $\frac{1}{2}$ -inch \times 2 $\frac{1}{2}$ -inch chamfered fillets plugged to wall ... | -/1 $\frac{1}{2}$ | 0 | 1 | 4 |
| | 53 | " | $\frac{1}{2}$ -inch \times 7-inch shelves rounded one edge | -/3 $\frac{1}{2}$ | 0 | 15 | 0 |
| | | | No. 8 Bearers 2 inches \times 2 $\frac{1}{2}$ inches \times 11 inches, shaped and pinned to wall | -/6 | 0 | 4 | 0 |
| | | | <i>Fixing only.</i> | | | | |
| | | | No. 10 Fix furniture to windows (elsewhere provided) and leave in working order | -/6 | 0 | 5 | 0 |
| | | | No. 18 Ditto ironmongery to doors and hang same and leave in working order | 1/- | 0 | 18 | 0 |
| | | | Carried to Summary | | £52 | 2 | 11 |
| | | | IRONFOUNDER. | | | | |
| | | | <i>Cast Iron (Scotch manufacture).</i> | | | | |
| | 25 | run | 5-inch deep half-round caves gutter bolted and jointed with red lead cement, and fixed with iron straps, 18 inches \times $\frac{3}{4}$ inch \times $\frac{1}{4}$ inch screwed to rafters ... | 1/8 | 2 | 1 | 8 |
| | | | No. 12 Stopped ends | -/6 | 0 | 6 | 0 |
| | | | No. 4 Outlets cast on | 1/- | 0 | 4 | 0 |
| | 19 | run | 2 $\frac{1}{2}$ -inch round rain-water pipes with ears cast on and fixing with wrot-iron rose headed nails to brickwork | 1/9 | 1 | 13 | 10 |
| | | | No. 4 Swannecks, 9-inch projection | 1/6 | 0 | 6 | 0 |
| | 6 | " | 4-inch ditto to form ventilating shaft to drains | 3/- | 0 | 18 | 0 |
| | | | No. 1 Cowl to ditto | 1/- | 0 | 1 | 0 |
| | | | No. 2 Pairs of shoes to door frames including pattern ... | 2/6 | 0 | 5 | 0 |
| | | | No. 2 Small soot doors and frames | 2/6 | 0 | 5 | 0 |
| | | | <i>Wrot Iron.</i> | | | | |
| | | Lbs. | In hooks, straps, bolts, &c., to doors, &c.... | 28/- | 0 | 14 | 0 |
| | 2 | | | | | | |
| | 38 | run | $\frac{1}{4}$ -inch \times $\frac{3}{4}$ -inch galvanized weather bar cut to lengths and bedded in red lead cement | -/3 | 0 | 9 | 6 |
| | | | Carried to Summary | | £7 | 4 | 0 |
| | | | PLUMBER AND GLAZIER. | | | | |
| | | | Milled lead and labour in gutters and flashings | 20/- | 3 | 8 | 0 |
| | | | Lead wedging to flashings | -/1 | 0 | 3 | 4 |
| | | | No. 2 1 $\frac{1}{2}$ -inch lead waste pipes (18 lbs. per yard) about 3 feet long, including copper mesh and fixing to earthenware sink | 5/- | 0 | 10 | 0 |
| | | | <i>Glazing.</i> | | | | |
| | 6 | supl. | $\frac{1}{2}$ -inch rolled plate and glazing in small squares | -/8 | 0 | 4 | 0 |
| | 103 | " | 21-ounce " thirds " sheet and glazing in small squares ... | -/5 | 2 | 2 | 11 |
| | 3 $\frac{1}{2}$ | " | Perforated zinc nailed with zinc nails | 1/- | 0 | 3 | 6 |
| | | | Carried to Summary | | £6 | 11 | 9 |

PAINTER.

The materials and workmanship to be the best of their respective kinds; genuine old white lead only to be used.

All surfaces to be well cleaned and rubbed down between each coat.

| Yards. | Feet. | | | | £ | s. | d. | |
|--------|-------|-------|--|-------------------|----------|----|----|--|
| | | | <i>On Wood.</i> | | | | | |
| 73 | | supl. | Knot, prime, stop and paint three oils in plain colours | -/9 | 2 | 14 | 9 | |
| | 1054 | run | Ditto rail | -/0 $\frac{1}{4}$ | 1 | 2 | 0 | |
| | 355 | " | Ditto skirting | -/0 $\frac{1}{4}$ | 0 | 7 | 4 | |
| | | | No. 20 ditto frames | -/4 | 0 | 6 | 8 | |
| | | | No. 4 ditto large frames | -/6 | 0 | 2 | 0 | |
| | | | No. 26 ditto dozen squares | -/3 | 0 | 6 | 6 | |
| | | | <i>On Iron.</i> | | | | | |
| 25 | | run | Two oils before fixing and two after fixing on eaves gutters inside and out | -/3 | 0 | 6 | 3 | |
| 26 | | " | Ditto on pipes... .. | -/3 | 0 | 6 | 6 | |
| | | | No. 2 black iron hinges, &c., on doors (coalhouses) ... | -/3 | 0 | 0 | 6 | |
| | | | <i>On Walls ana Ceilings.</i> | | | | | |
| 402 | | supl. | Two coats "Duresco" approved tints, on walls... .. | -/3 | 5 | 0 | 6 | |
| 152 | | " | Twice lime whiten ceilings | -/2 | 1 | 5 | 4 | |
| | | | Carried to Summary | | £11 18 4 | | | |

PROVISION.

Allow the sum of £9 12s., which will be deducted in full and expended by the Owner in purchase of fire-grates, coppers, and furnace works and ironmongery for doors and windows, all of which will be delivered on the site ready for fixing by the contractor

9 12 0

Carried to Summary

£9 12 0

SUMMARY.

| | | | | | | | | |
|----------------------|-----|-----|-----|-----|-----|-----|-----|-----------|
| Excavator and Drains | ... | ... | ... | ... | ... | ... | ... | 11 18 8 |
| Bricklayer | ... | ... | ... | ... | ... | ... | ... | 119 0 8 |
| Mason | ... | ... | ... | ... | ... | ... | ... | 9 18 8 |
| Tiler | ... | ... | ... | ... | ... | ... | ... | 29 5 1 |
| Plasterer | ... | ... | ... | ... | ... | ... | ... | 28 1 6 |
| Carpenter | ... | ... | ... | ... | ... | ... | ... | 32 19 10 |
| Joiner | ... | ... | ... | ... | ... | ... | ... | 52 2 11 |
| Ironfounder | ... | ... | ... | ... | ... | ... | ... | 7 4 0 |
| Plumber and Glazier | ... | ... | ... | ... | ... | ... | ... | 6 11 9 |
| Painter | ... | ... | ... | ... | ... | ... | ... | 11 18 4 |
| Provision | ... | ... | ... | ... | ... | ... | ... | 9 12 0 |
| Total Estimate | ... | ... | ... | ... | ... | ... | ... | £318 13 5 |

**BILL OF QUANTITIES AND SCHEDULE OF PRICES FOR A PAIR
OF PRIVIES AND ASHPIT.**

| | | | ALL TRADES. | | | £ | s. | d. |
|--------|-------|-------|---|------|--|------------|-----------|-----------|
| Yards. | Feet. | | | | | | | |
| 3 | 12 | cubo | Excavate surface trenches (as before) | 1/6 | | 0 | 5 | 2 |
| 10 | 6 | supl. | Ditto surface soil 6 inches deep | -/2 | | 0 | 1 | 9 |
| 34 | | " | Stock brickwork in mortar reduced to one brick thick ... | 4/4 | | 7 | 7 | 4 |
| 56 | | " | Extra on the stock brickwork for pointed face | -/4 | | 0 | 18 | 8 |
| | | " | 36-foot run bullnose angles | -/1 | | 0 | 3 | 0 |
| | 26 | " | Damp-proof course (as before) | -/3 | | 0 | 6 | 6 |
| 6 | | " | Half-brick blue brick lining in cement | 4/9 | | 1 | 8 | 6 |
| 6½ | | " | Paving of 1½-inch blue pavours | 4/- | | 1 | 5 | 4 |
| | 4 | run | Thresholds one brick wide of blue bricks set on edge in cement | -/4 | | 0 | 1 | 4 |
| | 5 | " | Sills one brick wide of blue cant bricks set in cement ... | -/6 | | 0 | 2 | 6 |
| | 5½ | " | 9-inch x 9-inch steps of stock bricks set on edge in cement | -/6 | | 0 | 2 | 9 |
| 1 | | cubo | Cement concrete (as before) | 13/6 | | 0 | 13 | 6 |
| | 13½ | supl. | 2-inch sawn stone front to seat | 1/- | | 0 | 13 | 6 |
| | 12 | run | 4½-inch x 9-inch scappled stone heads to doorways ... | 1/- | | 0 | 12 | 0 |
| | | | No. 8 stones 9 inches x 9 inches x 6½ inches tooled all round, and letting in ironwork, &c., as before ... | 3/- | | 1 | 4 | 0 |
| Sqs. | Feet. | | | | | | | |
| 1 | 30 | supl. | Lathing, flat tiling, and torching | 38/9 | | 2 | 10 | 4 |
| | 31 | run | Cement filleting gables | -/2 | | 0 | 5 | 2 |
| | 7½ | " | Tile ridge | -/7 | | 0 | 4 | 4 |
| | 15½ | " | Tilting fillet to eaves... .. | -/2 | | 0 | 2 | 7 |
| | 8 | " | Ridge board | -/1½ | | 0 | 1 | 0 |
| | 93 | " | 2-inch x 3-inch common rafters | -/1½ | | 0 | 13 | 6 |
| | 16 | " | 3-inch x 4½-inch wall-plates... .. | -/2½ | | 0 | 3 | 8 |
| | 11 | " | 3-inch x 4½-inch purlins | -/2½ | | 0 | 2 | 6 |
| | 7 | " | 4-inch x 4½-inch oak bearer to seat | -/6 | | 0 | 3 | 6 |
| | 35 | supl. | ½-inch ledged doors | -/6 | | 0 | 17 | 6 |
| | | | No. 2 7-inch clean deal closet seats, 2 feet 10 inches long, with rounded edge, holes perforated, and edges of ditto rounded, and including stont bearers... .. | 5/- | | 0 | 10 | 0 |
| | | | 1 cwt. wrot iron in straps, hinges, hooks, and bolts to doors, &c. | 28/- | | 1 | 8 | 0 |
| Yards. | Feet. | | | | | | | |
| 8 | | supl. | Knot, prime, stop and paint one coat on woodwork ... | -/6 | | 0 | 4 | 0 |
| | | | No. 4 black sets of iron fittings on doors... .. | -/3 | | 0 | 1 | 0 |
| | | | Total estimate | | | £22 | 12 | 11 |

BILL OF QUANTITIES FOR BUILDINGS FOR SMALL HOLDING
ILLUSTRATED ON PLATE XIII., FIGS 89-91.

BUILDINGS EXCLUDING COVERED YARD.

| | | EXCAVATOR AND DRAINS. | | | | |
|--------------------------------------|-------|-----------------------|---|------|-----|------|
| Yards. | Feet. | | | | £ | s d. |
| 13 | | cube | Excavate surface trenches (as before) | 1/6 | 0 | 19 6 |
| 108 | | supl. | Ditto surface soil | -/2 | 0 | 18 0 |
| 59 | | .. | Hard dry brick rubbish under pavings (as before) ... | -/4 | 0 | 19 8 |
| 10 | | .. | Level and ram ground in cartshed | -/1 | 0 | 0 10 |
| <i>Drains.</i> | | | | | | |
| | 60 | run | 4-inch drain (as before) | -/6 | 1 | 10 0 |
| | | | No. 3 Extra for 4-inch bends | 1/- | 0 | 3 0 |
| | | | No. 1 Ditto for 4-inch junctions | 1/6 | 0 | 1 6 |
| | | | No. 1 6-inch glazed earthenware gully (as before but without channel) | 5 6 | 0 | 5 6 |
| | | | Carried to Summary | | £1 | 18 0 |
| BRICKLAYER, (Preamble as before.) | | | | | | |
| 170 | | supl. | Stock brickwork in lime mortar in one-brick and half- brick walls reduced to one brick thick | 4/4 | 36 | 16 8 |
| 285 | | .. | Extra on the stock brickwork for pointed face | -/4 | 4 | 15 0 |
| | | | 72-feet run of bullnose or cant angles | -/1 | 0 | 6 0 |
| | | | 10-feet run of fair cut skewbacks | -/2 | 0 | 1 8 |
| | | | 94-feet run of fair circular cutting... .. | -/2 | 0 | 5 8 |
| 3 | | .. | Ditto for arches in cement (as before) | 1/6 | 0 | 4 6 |
| 59 | | .. | Paving of selected hard stocks set on edge (as before) ... | 2/8 | 7 | 17 4 |
| 6 | | .. | Paving of well puddled clay, spread levelled and rammed solid 5 inches thick | 1/- | 0 | 6 0 |
| | 20 | run | Cant brick on end at channel set with cement | -/3 | 0 | 5 0 |
| | 10 | .. | Window-sills one brick wide of stock bricks set sloping on edge in cement including cutting for same ... | -/5 | 0 | 4 2 |
| | 152 | .. | Damp-proof course of one course of blue bricks set on a bed of cement and jointed with same reduced to one brick wide | -/3½ | 2 | 4 4 |
| | 66 | .. | Labour and materials beam filling 4½-inch wide × 7-inch high (general brickwork has been measured to under side of wall-plate) | -/3 | 0 | 16 6 |
| | 52 | .. | Hoop-iron bond tarred and sanded (as before) | -/2 | 0 | 8 8 |
| | 144 | .. | Bed bond timbers and plates | -/1 | 0 | 12 0 |
| | | | No. 3 3-inch glazed stoneware pipes without sockets, in- cluding cutting and fixing in walls and making good in cement | 2/- | 0 | 6 0 |
| <i>Mangers.</i> | | | | | | |
| 1 | 19 | cube | Cement concrete (as before) filled in and sloped for half pipes | 15/- | 1 | 5 6 |
| | 45 | run | Cement fillet to edges of mangers | -/2 | 0 | 7 6 |
| | | | No. 7 Salt glazed stoneware channels without sockets 24-inch long × 15-inch diameter set in cement ... | 5/- | 1 | 15 0 |
| | | | No. 14 Rounded ends to ditto formed in the concrete and finished with a trowelled face in cement | 2/6 | 1 | 15 0 |
| | | | Carried to Summary | | £60 | 12 6 |

| Yards. | Feet. | | MASON. | | £ s. d. |
|--------|-------|-------|---|------|----------------|
| | | | (Preamble as before.) | | |
| | 20 | run | 3-inch × 9-inch heel stone chamfered one edge and roughly tooled and fixing in cowshed | -/8 | 0 13 4 |
| | | | No. 7 Stones for door hooks 9-inch × 9-inch × 3½-inch, &c. (as before) | 2/- | 0 14 0 |
| | | | No. 2 Ditto but 9-inch × 9-inch × 6½-inch ditto ... | 3/- | 0 6 0 |
| | | | No. 10 Stones for door frames 9-inch × 9-inch × 6½-inch mortised for dowels | 2/6 | 1 5 0 |
| | | | No. 1 Stone for pig trough opening 18-inch × 15-inch × 3-inch tooled all faces, rounded two edges, corners rounded and slightly dished one face and set sloping | 7/6 | 0 7 6 |
| | | | Carried to Summary | | <u>£3 5 10</u> |
| | | | TILER. | | |
| Sqs. | Feet. | | | | |
| 11 | 14 | supl. | Lathing, flat tiling and torching (as before) | 38/9 | 21 11 8 |
| | 60 | run | Cement filleting at gables | -/2 | 0 10 0 |
| | 36 | " | Tile ridge (as before) | -/7 | 1 1 0 |
| | | " | Extra for No. 5 ventilating ridges | -/4 | 0 1 8 |
| | | | Carried to Summary | | <u>£23 4 4</u> |
| | | | CARPENTER. | | |
| | | | (Preamble as before.) | | |
| | | | <i>Roofs.</i> | | |
| | 36 | run | 1-inch × 5-inch ridge board | -/2 | 0 6 0 |
| | 72 | " | 1½-inch × 4½-inch splayed tilting fillet at eaves | -/2 | 0 12 0 |
| | 60 | " | 1-inch × 5½-inch verge boards (as before) | -/3½ | 1 2 6 |
| | | | No. 4 extra for returning beads at foot | -/3 | 0 1 0 |
| | | | No. 2 extra for tongued and mitred angles | -/3 | 0 0 6 |
| | 60 | " | 1-inch × 2-inch moulded and chamfered fillet to verge boards | -/1½ | 0 7 6 |
| | 900 | " | 2-inch × 4-inch common rafters | -/2 | 7 10 0 |
| | 13 | " | 3-inch × 4½-inch wall-plate chamfered one edge ... | -/3 | 0 3 3 |
| | 73 | " | 3-inch × 6-inch ditto but not chamfered... .. | -/4 | 1 4 4 |
| | 72 | " | 3-inch × 7-inch purlins | -/4½ | 1 7 0 |
| | | | No. 1 Truss frame as follows and hoist and fix 7 feet above ground and fix ironwork (elsewhere given) :- | | |
| | 12 | run | 3-inch × 4-inch struts | -/3 | 0 3 0 |
| | 22 | " | 3-inch × 7-inch tie beam | -/5 | 0 9 2 |
| | 23 | " | 3-inch × 7-inch rafters | -/5 | 0 9 7 |
| | | | No. 2 Cleats 18 inches × 6 inches × 3 inches | -/6 | 0 1 0 |
| | | | No. 8 Ends of plates and purlins reduced and wrot ... | -/3 | 0 2 0 |
| | | | <i>Stall Divisions and Mangers.</i> | | |
| | 50 | supl. | 1-inch white bead butt-jointed boarding | -/2½ | 0 10 5 |
| | | | 24-feet run circular cutting and chamfered edge ... | -/1½ | 0 3 0 |
| | 20 | run | 1½-inch × 11-inch board splayed one edge and rounded one edge | -/6 | 0 10 0 |
| | 24 | " | 2½-inch × 3½-inch rails twice chamfered... .. | -/3 | 0 6 0 |
| | | | No. 8 Ends housed to posts | -/3 | 0 2 0 |
| | 42 | " | 2½-inch × 3½-inch rails four times chamfered | -/3½ | 0 12 3 |
| | | | No. 4 Notchings to posts | -/3 | 0 1 0 |
| | | | No. 4 Ends pinned to walls | -/3 | 0 1 0 |
| | 58 | " | 3-inch × 5½-inch oak bond twice chamfered | -/9 | 2 3 6 |
| | | | No. 10 Dovetail halvings | -/6 | 0 5 0 |
| | | | No. 6 Ends pinned to walls | -/3 | 0 1 6 |
| | 12 | " | 5-inch × 5-inch oak posts stop chamfered all edges ... | 1/3 | 0 15 0 |
| | 10 | " | 5-inch × 6-inch ditto | 1/6 | 0 15 0 |
| | | | No. 4 Tops of posts splayed | -/6 | 0 2 0 |

| | | | | | | |
|-----------------------------|-------|------|---|---------|--|-----------------|
| Sqs | Feet. | | <i>Floors.</i> | | | £ s. d. |
| 330 | supl. | | 1-inch rough boarding edges shot | 15/- | | 2 9 6 |
| 252 | run | | 3-inch × 6-inch joists | -/4 | | 4 4 0 |
| 16 | " | | 3-inch × 9-inch plate | -/6 | | 0 8 0 |
| | | | <i>Sundries</i> | | | |
| 9 | " | | 3/4-inch × 3-inch turning pieces to arches... .. | -/1 | | 0 0 9 |
| 37 | " | | 3-inch × 9-inch lintels | -/5 | | 0 15 5 |
| | | | Carried to Summary | | | <u>£28 4 2</u> |
| JOINER. | | | | | | |
| (Preamble as before.) | | | | | | |
| | | | <i>Windows.</i> | | | |
| 26 | supl. | | 1 1/2-inch sliding casements, chamfered and rebated with 1 3/8-inch bars in small squares and including small iron rollers to one edge | -/9 | | 0 19 6 |
| 5 | " | | 1 1/2-inch chamfered casements hung at bottom to open inwards to and including 4 1/4-inch × 3 3/4-inch rebated and chamfered frame with oak sunk and weathered sill | 1/6 | | 0 7 6 |
| 40 | run | | 2 1/2-inch × 3-inch guides twice chamfered and once grooved | -/5 | | 0 16 8 |
| | | | <i>Doors.</i> | | | |
| 76 | supl. | | 7/8-inch ledged and braced doors (as before) | -/8 | | 2 10 8 |
| 70 | " | | 1 1/8-inch framed ledged and braced doors (as before) cut and hung in two heights | 1/3 | | 4 7 6 |
| 89 | run | | 3 3/4-inch × 4 3/4-inch rebated and chamfered frames | -/8 | | 2 19 4 |
| 3 1/2 | " | | 3 3/4-inch × 4 3/4-inch beaded centre on frame | -/9 | | 0 2 7 |
| | | | No. 15 5-inch coach screws to door frames | -/3 | | 0 3 9 |
| | | | No. 8 Hanging doors and fixing ironwork (elsewhere given) to same | 1/6 | | 0 12 0 |
| | | | Carried to Summary | | | <u>£12 19 6</u> |
| IRONFOUNDER. | | | | | | |
| | | | <i>Cast Iron.</i> | | | |
| 24 | run | | 4 1/2-inch deep half-round eaves gutter on and including irons 18 inches × 3/4 inch × 3/8 inch | 1/6 | | 1 16 0 |
| | | | No. 6 Stopped ends | -/6 | | 0 3 0 |
| | | | No. 2 Outlets cast on | 1/- | | 0 2 0 |
| 5 | 2 | " | 2-inch round rain-water pipes (as before)... .. | 1/6 | | 0 8 6 |
| | | | No. 2 Swannecks 9-inch projection | 1/6 | | 0 3 0 |
| | | | No. 5 Pairs of shoes to door frame and pattern | 2/6 | | 0 12 6 |
| | | | No. 2 Hoppers to windows 13 1/2 inches × 8 inches of 1/8 inch metal screwed to wood | 1/- | | 0 2 0 |
| | | | <i>Wrot Iron.</i> | | | |
| Cwts. | Qrs | Lbs. | In hinges, hooks, straps, rods and bolts to doors and roof, &c. | 28/- | | 4 4 0 |
| 3 | | | No. 2 5-inch coach screws | -/3 | | 0 0 6 |
| | | | <i>Galvanised Iron.</i> | | | |
| | | | No. 7 Sheets of corrugated iron 9 feet long, 22 gauge | 6/6 | | 2 5 6 |
| | | | No. 16 Spikes | -/1 | | 0 1 4 |
| | | | No. 6 Bolts and nuts | -/1 1/2 | | 0 0 9 |
| | | | Carried to Summary | | | <u>£9 19 1</u> |
| PLUMBER AND GLAZIER. | | | | | | |
| Yards | Feet | | supl. 1/2-inch rolled plate glass and glazing in small squares | -/8 | | 0 15 4 |
| | 23 | | Carried to Summary | | | <u>£0 15 4</u> |

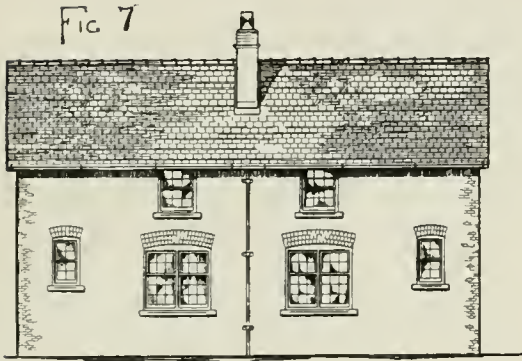
| Yards. | Feet. | PAINTER. | | | £ | s. | d. |
|----------------------------|-------|-----------------------|--|------|-----|------|----|
| | | (Preamble as before.) | | | | | |
| | | <i>On Wood.</i> | | | | | |
| 55 | | supl. | Knot, prime, stop and paint three oils in plain colours | -9 | 2 | 1 3 | |
| | | | No. 10 Ditto frames | -6 | 0 | 5 0 | |
| | | | No. 7½ Ditto dozen squares... .. | -3 | 0 | 1 10 | |
| | | <i>On Iron.</i> | | | | | |
| 29 | 2 | run | Two oils before fixing and two after fixing on eaves gutters inside and out and on pipes | -3 | 0 | 7 5 | |
| | | | No. 9 Black sets of iron fittings on doors | -3 | 0 | 2 3 | |
| | | | Carried to Summary | | £2 | 17 9 | |
| COVERED YARD (ALL TRADES). | | | | | | | |
| 14 | | cube | Excavate for trenches and for floor (as before) | 1/6 | 1 | 1 0 | |
| 33 | | supl. | Excavate surface soil (as before) | -2 | 0 | 6 4 | |
| 33 | 3 | " | Bed of cement concrete spread, levelled, and rammed 5 inches thick | 2/- | 3 | 6 8 | |
| 16 | | run | 4-inch drain (as before) | 1/6 | 1 | 4 0 | |
| | | | No. 1 extra for 4-inch bend | 1/- | 0 | 1 0 | |
| | | | No. 1 ditto for 4-inch junction | 1/6 | 0 | 1 6 | |
| 35 | | supl. | Stock brickwork (as before) | 4/4 | 7 | 11 8 | |
| 27 | 4 | " | Extra for pointed face | -4 | 0 | 9 2 | |
| | | | 15-feet run of double bullnose angles | -3 | 0 | 3 9 | |
| | 17 | run | 12-inch × 9-inch rough stone kerb | -6 | 0 | 8 6 | |
| | | | No. 4 Stones for hooks, 18 inches × 9 inches × 10 inches two rounded angles on each, &c. (as before) | 7/6 | 1 | 10 0 | |
| 416 | | supl. | ¾-inch creosoted roof boarding, boards 7 inches wide, twice grooved and including fixing with steel wire and hobnails at all bearings ⅜ inch apart ... | 23/- | 4 | 15 8 | |
| 86 | | run | 3-inch × 6-inch plates and purlins | -3½ | 0 | 19 9 | |
| 17 | | " | 3-inch × 9-inch ridge piece twice chamfered | -7 | 0 | 9 11 | |
| | | | No. 2 Trusses frame as follows and hoist and fix 7 feet above ground :- | | | | |
| 24 | | run | 3-inch × 3-inch struts | -2½ | 0 | 5 0 | |
| 92 | | " | 3-inch × 6-inch tie beams and rafters | -4½ | 1 | 14 6 | |
| | | | No. 8 Cleats 18 inches × 5 inches × 4 feet | -6 | 0 | 4 0 | |
| 86 | | supl. | Weather boarding of feather-edged creosoted boards (measured net) | -3 | 1 | 1 6 | |
| | | | 27 feet run cutting to rake and waste | -1½ | 0 | 3 4 | |
| 33 | | run | 2-inch × 3½-inch rails 4 times chamfered | -2 | 0 | 5 6 | |
| | | | No. 10 Ends housed to posts | -3 | 0 | 2 6 | |
| | | | No. 2 Ends pinned to wall | -3 | 0 | 0 6 | |
| 16 | | run | 3-inch × 5-inch posts four times chamfered | -6 | 0 | 8 0 | |
| 9 | | " | 10-inch × 10-inch oak post four times chamfered ... | 2/- | 0 | 18 0 | |
| | | | No. 1 Rounded top | 2/- | 0 | 2 0 | |
| | | | No. 2 Gates and iron fittings to same and hanging each 10 feet 6 inches long × 4 feet high... .. | 20/- | 2 | 0 0 | |
| 1 | | run | 4½-inch half-round eaves gutter and painting | 1/6 | 0 | 8 0 | |
| | | | No. 1 Stopped end | -6 | 0 | 0 6 | |
| | | ½ | Cwt. of iron in straps and bolts to roof | 28/- | 0 | 7 0 | |
| | | | Carried to Summary | | £30 | 9 3 | |

SUMMARY.

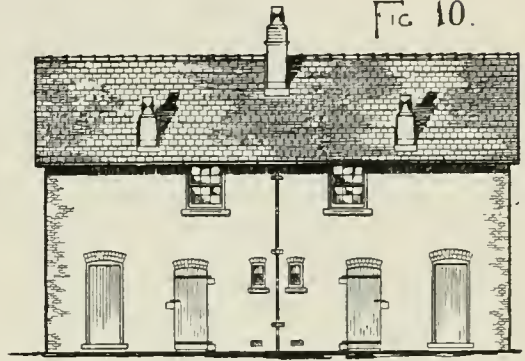
| | | | | | | | | | | | | |
|--------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|----|----|
| Excavator and drains | ... | ... | ... | ... | ... | ... | ... | ... | ... | £ | s. | d. |
| Bricklayer | ... | ... | ... | ... | ... | ... | ... | ... | ... | 4 | 18 | 0 |
| Mason | ... | ... | ... | ... | ... | ... | ... | ... | ... | 60 | 12 | 6 |
| Tiler | ... | ... | ... | ... | ... | ... | ... | ... | ... | 3 | 5 | 10 |
| Carpenter | ... | ... | ... | ... | ... | ... | ... | ... | ... | 23 | 4 | 4 |
| Joiner | ... | ... | ... | ... | ... | ... | ... | ... | ... | 28 | 4 | 2 |
| Ironfounder | ... | ... | ... | ... | ... | ... | ... | ... | ... | 12 | 19 | 6 |
| Plumber and Glazier | ... | ... | ... | ... | ... | ... | ... | ... | ... | 9 | 19 | 1 |
| Painter | ... | ... | ... | ... | ... | ... | ... | ... | ... | 0 | 15 | 4 |
| | | | | | | | | | | 2 | 17 | 9 |
| | | | | | | | | | | <hr/> | | |
| Covered yard, all trades | ... | ... | .. | ... | ... | ... | ... | ... | ... | 146 | 16 | 6 |
| | | | | | | | | | | 30 | 9 | 3 |
| | | | | | | | | | | <hr/> | | |
| Total estimate | ... | ... | ... | ... | ... | ... | ... | ... | ... | £177 | 5 | 9 |
| | | | | | | | | | | <hr/> | | |

PAIR OF LABOURER'S COTTAGES

SUITABLE FOR ANY ASPECT - EXCEPT DUE NORTH



SOUTH-ELEVATION



NORTH-ELEVATION

SCALE OF FEET

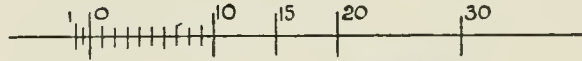
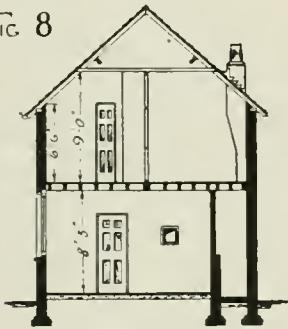


FIG 8



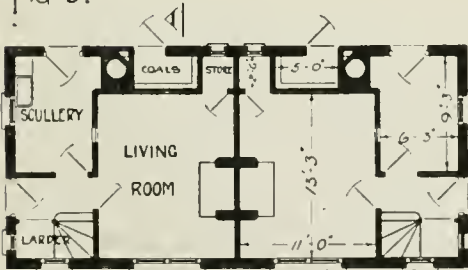
SECTION ON A-A

*Cost as per
Schedule of Prices*
£ 286-6-5



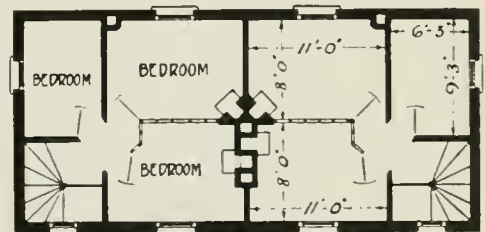
WEST-ELEVATION

FIG 9.



GROUND-FLOOR-PLAN

FIG 12

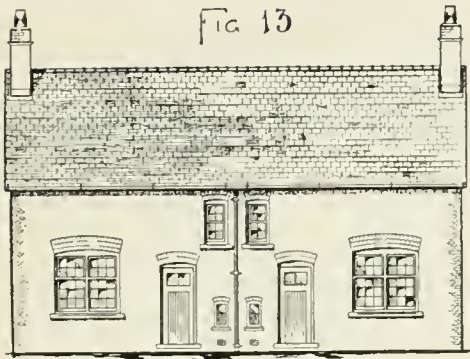


CHAMBER-PLAN

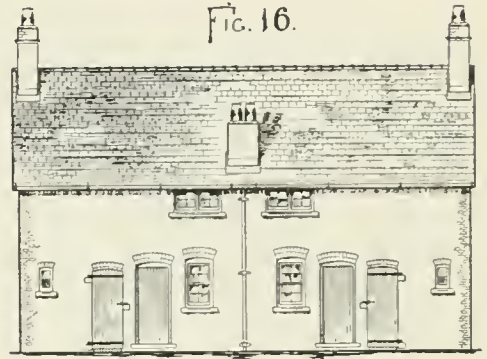
See page 19.

PAIR OF LABOURER'S COTTAGES

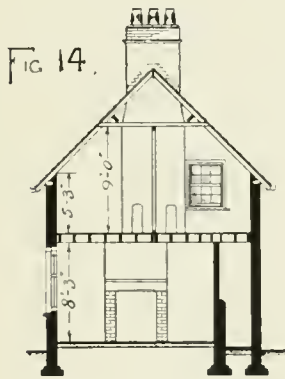
SUITABLE FOR ANY ASPECT



SOUTH-ELEVATION

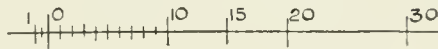


NORTH-ELEVATION

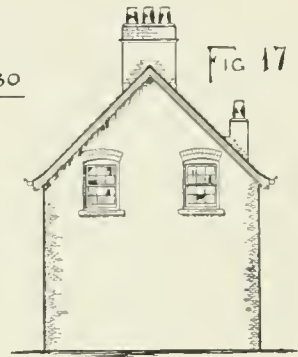


SECTION ON AA

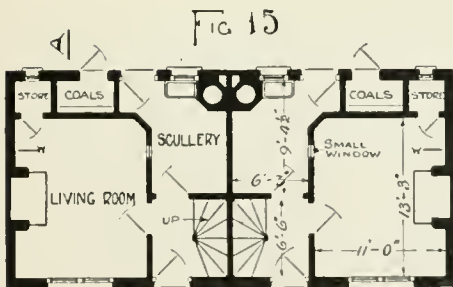
SCALE OF FEET



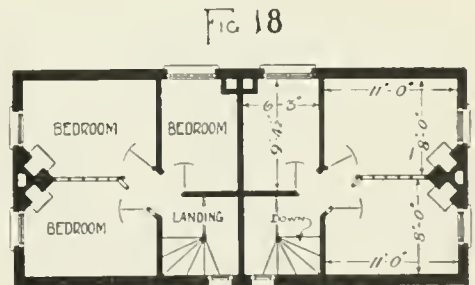
*Cost as per Schedule
of Prices
£ 285-6-1*



EAST-ELEVATION



GROUND-FLOOR PLAN

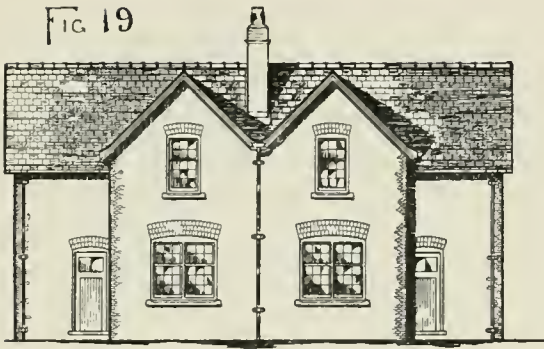


CHAMBER PLAN

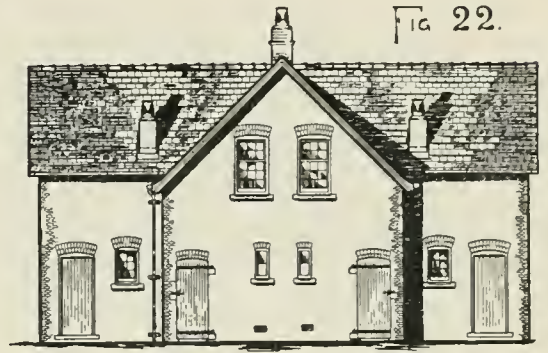
See page 20.

PAIR OF LABOURER'S COTTAGES

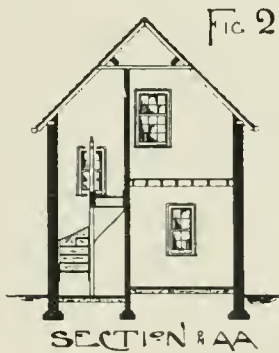
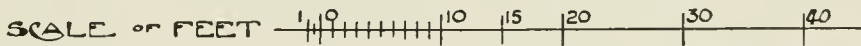
SUITABLE FOR ANY ASPECT - EXCEPT DUE NORTH



SOUTH-ELEVATION

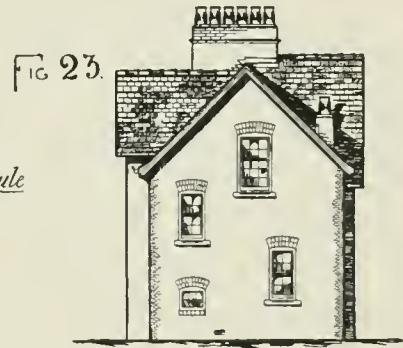


NORTH-ELEVATION

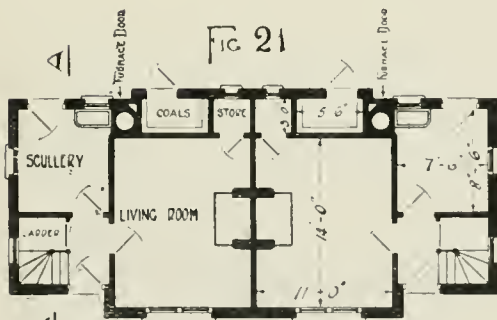


SECTION R & AA

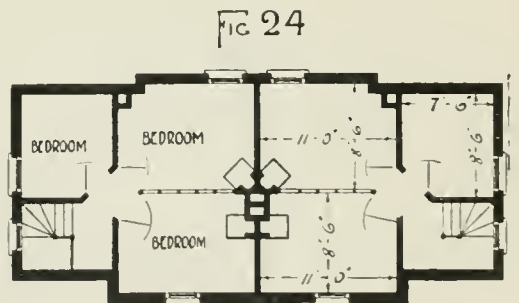
*Cost as per Schedule
of Prices
£ 303 - 8 - 3*



EAST-ELEVATION



GROUND-FLOOR-PLAN



CHAMBER-PLAN

PAIR OF LABOURERS COTTAGES

SUITABLE FOR ANY ASPECT,

FIG. 25.



SOUTH-ELEVATION

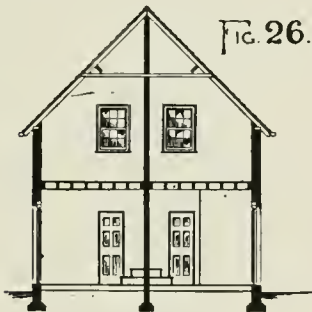
FIG 28



NORTH ELEVATION

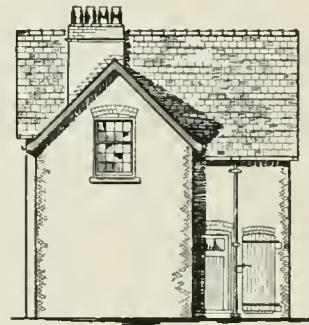
Cost as per Schedule of Prices £ 318-13-5

FIG. 26.



SECTION ON A.A.

FIG 29.



EAST-ELEVATION

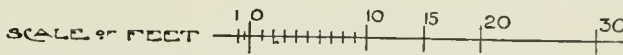
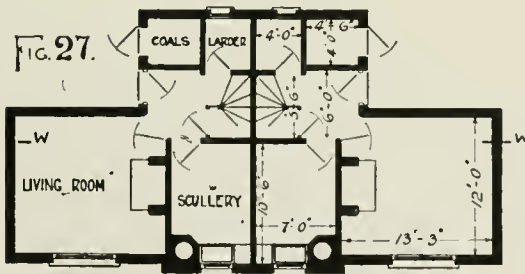
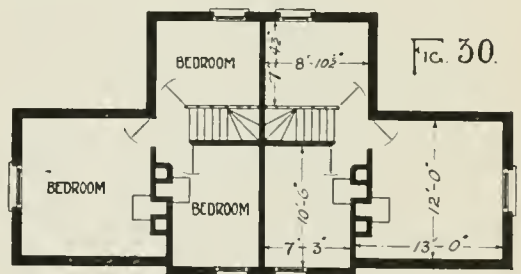


FIG. 27.



GROUND-FLOOR-PLAN.

FIG. 30.



CHAMBER-PLAN.

PAIR OF WORKMEN'S COTTAGES

SUITABLE FOR ANY ASPECT - EXCEPT DUE SOUTH

FIG 31



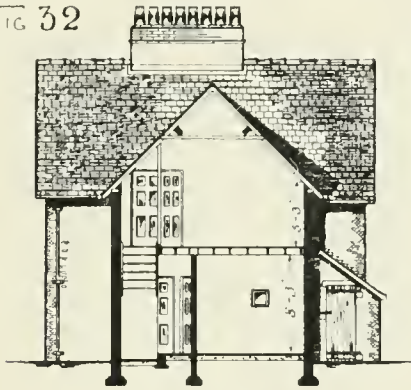
FRONT-ELEVATION

FIG 34



BACK-ELEVATION

FIG 32



SECTION ON A.A.

*Cost as per
Schedule of Prices
£381-4-6*

FIG 35



END-ELEVATION

SCALE - OF FEET

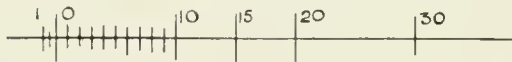
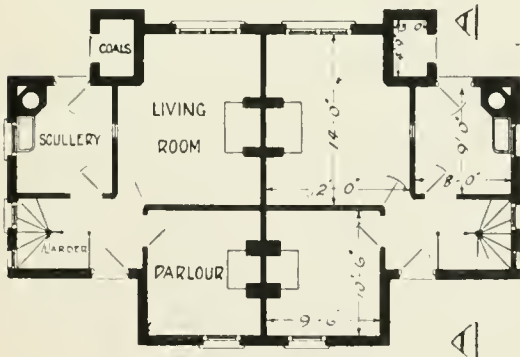
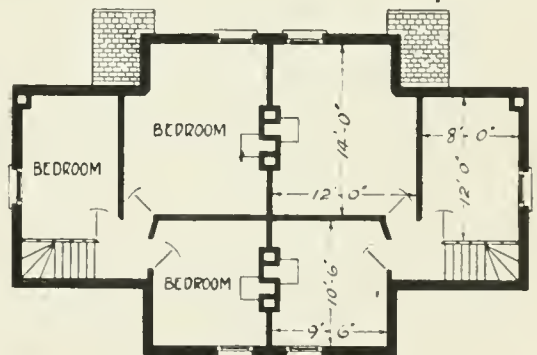


FIG 33



GROUND-FLOOR PLAN

FIG 36

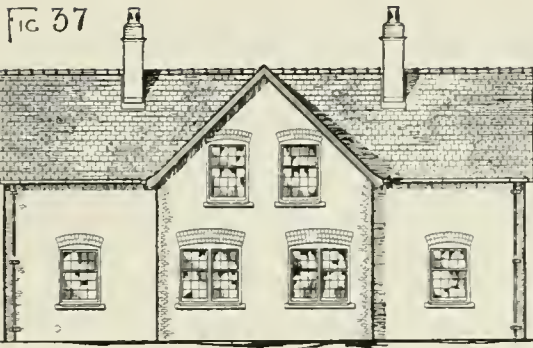


CHAMBER-PLAN

See page 21.

PAIR OF WORKMEN'S COTTAGES

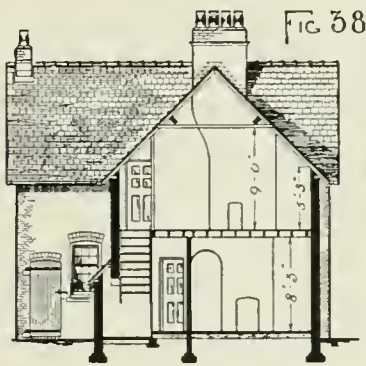
SUITABLE FOR ANY ASPECT - EXCEPT DUE NORTH



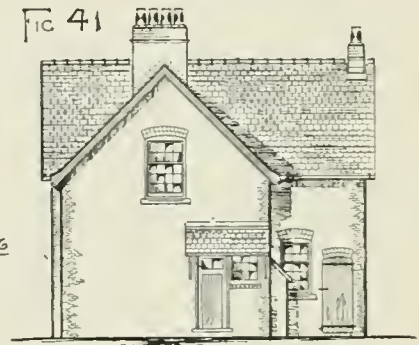
SOUTH-ELEVATION



NORTH-ELEVATION



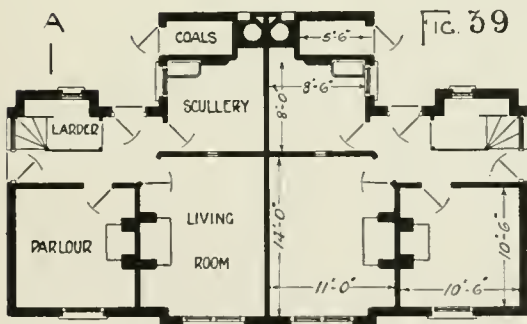
SECTION ON A.A.



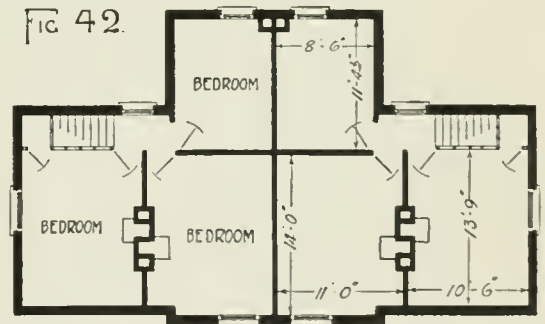
EAST-ELEVATION.

*Cost as per
Schedule of
Prices £ 105-3-6*

SCALE OF FEET 0 10 20



A GROUND-FLOOR-PLAN



CHAMBER-PLAN

See page 22.

DETACHED LABOURER'S COTTAGE.

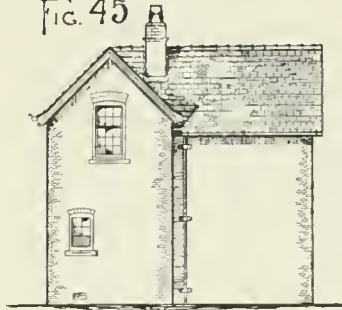
SUITABLE FOR ANY ASPECT.

FIG. 43.



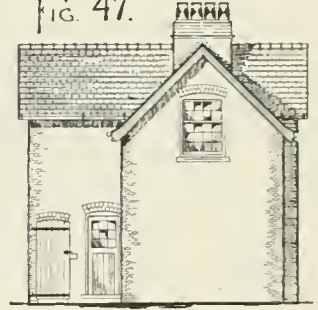
SOUTH-ELEVATION

FIG. 45.



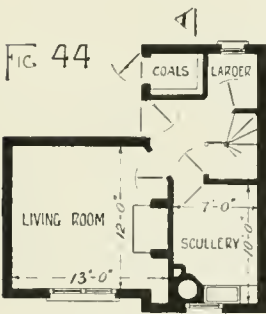
NORTH-ELEVATION

FIG. 47.



WEST-ELEVATION

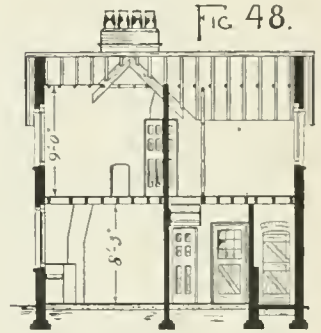
Cost as per Schedule of Prices £173-12-11



GROUND-FLOOR-PLAN



CHAMBER-PLAN



SECTION ON AA.

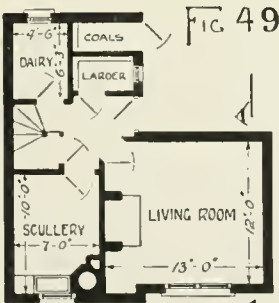
SCALE OF FEET



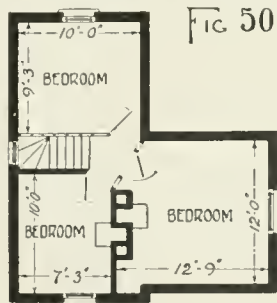
DETACHED COTTAGE FOR SMALL HOLDING

6 TO 12 ACRES - SUITABLE FOR ANY ASPECT

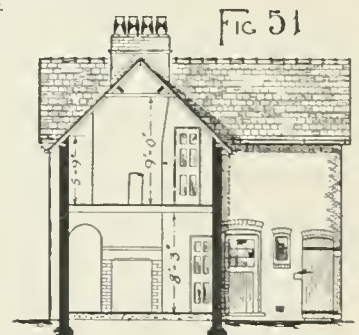
Cost as per Schedule of Prices £132-3-2



GROUND-FLOOR-PLAN



CHAMBER-PLAN.

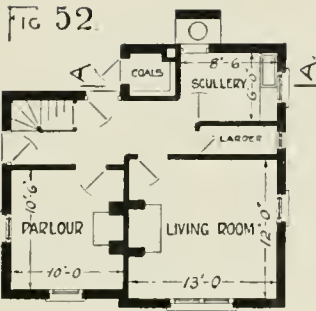


SECTION ON AA.

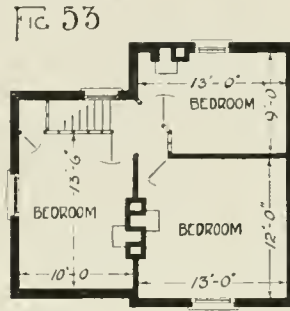
See page 22.

DETACHED COTTAGE

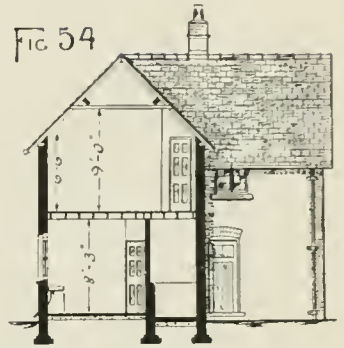
(Cost as per Schedule of Prices £251-19-2)



GROUND-FLOOR-PLAN



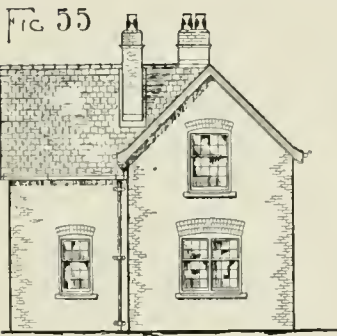
CHAMBER-PLAN



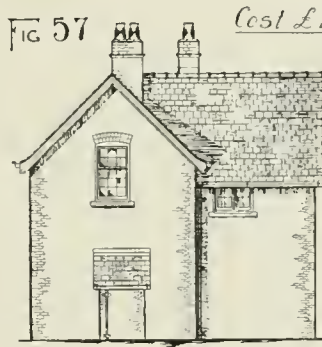
SECTION ON A-A.

DETACHED COTTAGE FOR SMALL HOLDING

15 TO 25 ACRES. SUITABLE FOR ANY ASPECT

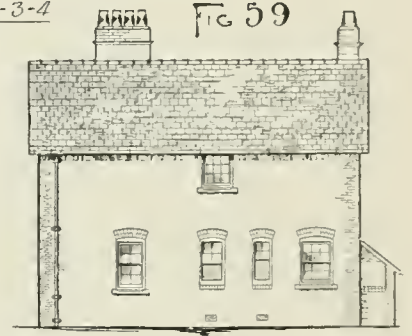


SOUTH-ELEVATION

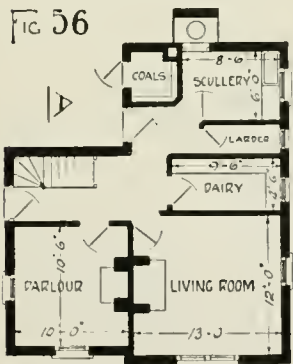


NORTH-ELEVATION

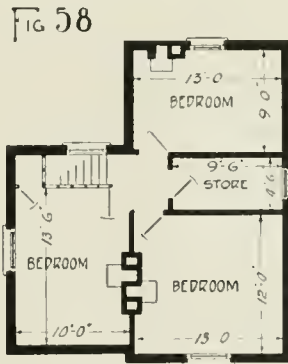
Cost £256-3-4



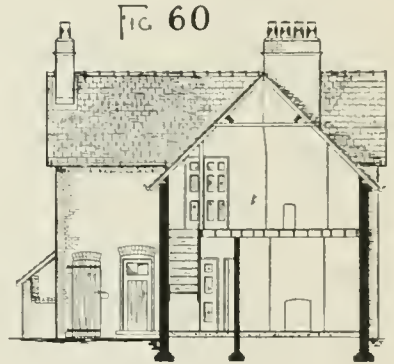
EAST-ELEVATION



GROUND-FLOOR-PLAN



CHAMBER-PLAN



SECTION ON A-A.

DETACHED COTTAGE FOR SMALL HOLDING
30 TO 45 ACRES SUITABLE FOR ANY ASPECT

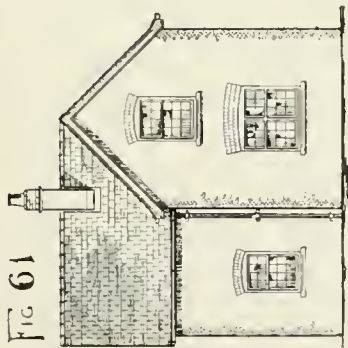


FIG 61

SOUTH-ELEVATION

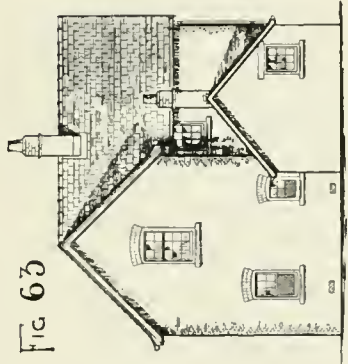


FIG 63

NORTH-ELEVATION

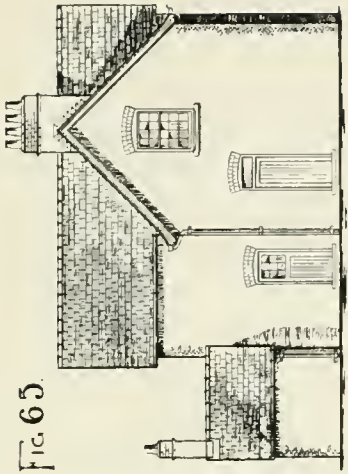


FIG 65

WEST-ELEVATION



Cost as per Schedule of Prices £ 287-11-8

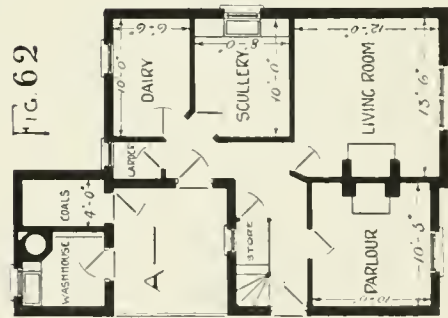


FIG 62

GROUND-FLOOR PLAN

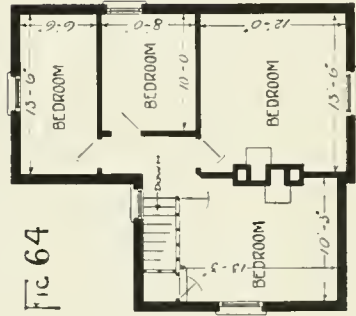


FIG 64

CHAMBER PLAN

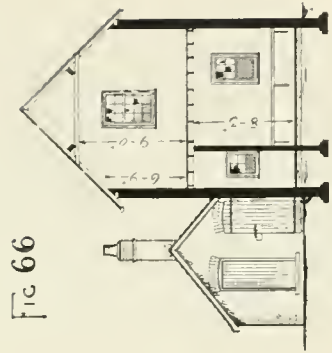


FIG 66

SECTION A-A

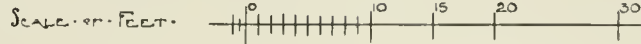
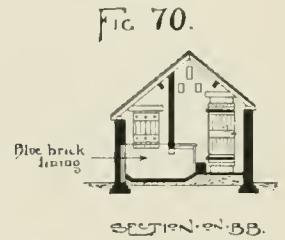
See page 23.

PRIVY AND PICSTYE
FOR DETACHED COTTAGE

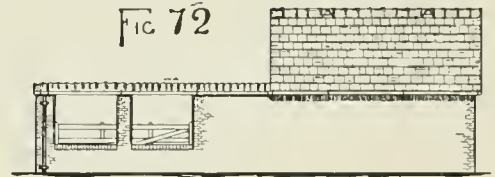
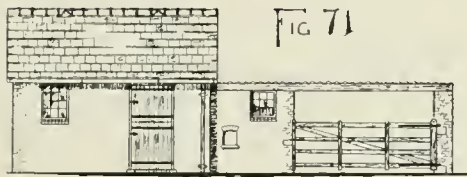
PRIVIES & ASHPIT
FOR PAIR OF COTTAGES



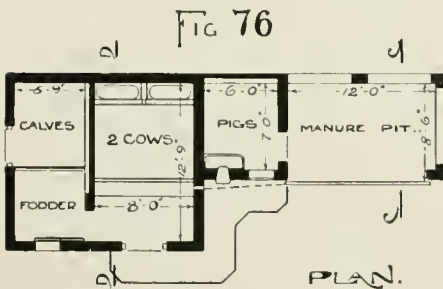
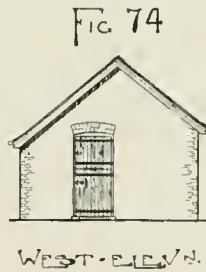
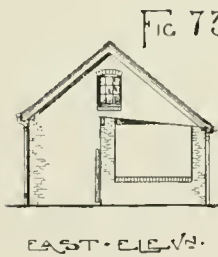
Cost £ 22 .12 .11



BUILDINGS FOR SMALL HOLDING
3 TO 8 ACRES



Cost as per Schedule of Prices £ 73 -13 -2.



See pages 23 and 34.

BUILDINGS FOR SMALL HOLDING

10 TO 15 ACRES

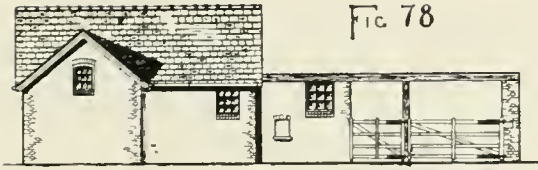


Fig 78

SOUTH - ELEVATION.

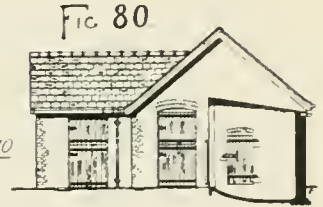


Fig 80

SECTION - of - A.A.

Cost as per
Schedule of
Prices £106-5-10

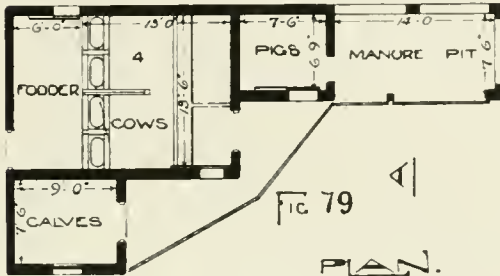


Fig 79

PLAN.

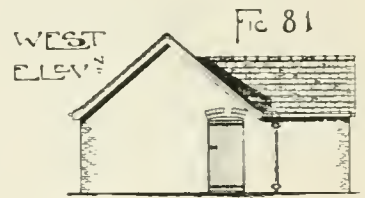
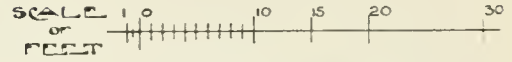


Fig 81

WEST
ELEVATION

BUILDINGS FOR SMALL HOLDING

15 TO 24 ACRES

Cost as per Schedule of Prices £158-13-2

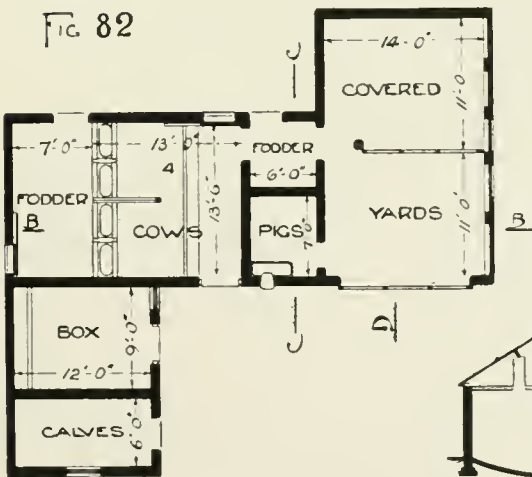


Fig 82

PLAN.

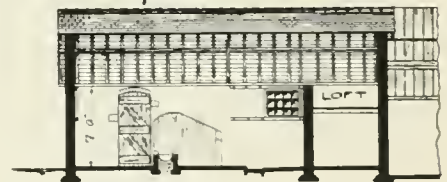


Fig 83

SECTION - of - B.B.

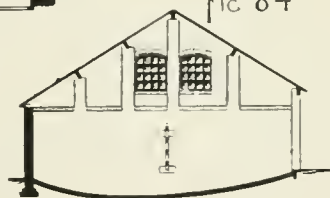


Fig 84

SECTION - of - D.D.



Fig 85

SECTION - of - C.C.

See page 34

BUILDINGS FOR SMALL HOLDINGS

18 TO 24 ACRES

FIG. 86.

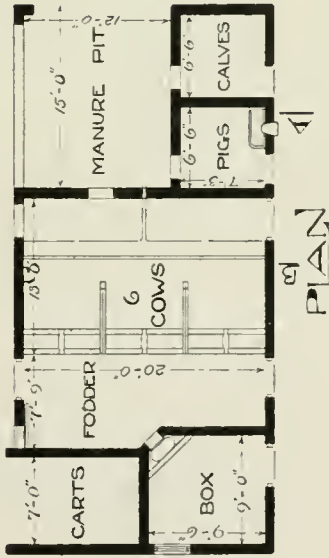


FIG. 87.

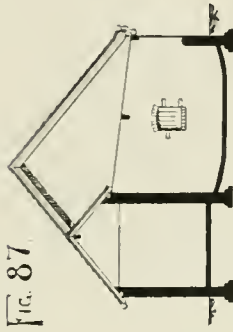
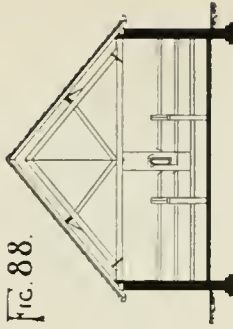
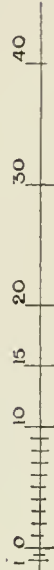


FIG. 88.



SECTION ON A.A.

SECTION ON B.B.



SCALE OF FEET.

20 TO 27 ACRES

Cost as per Schedule of Prices L.177-5-9

FIG. 89.

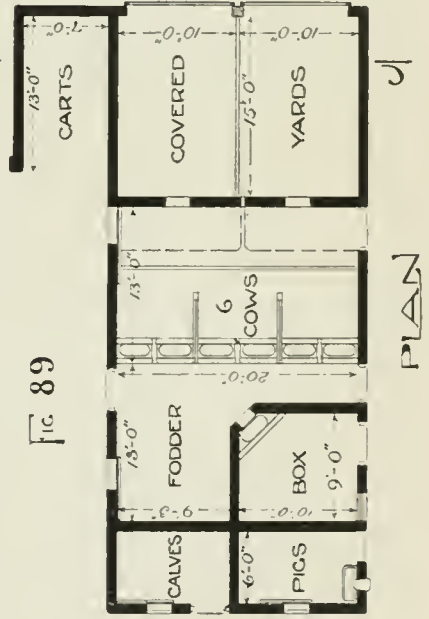
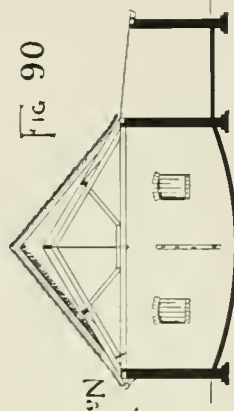
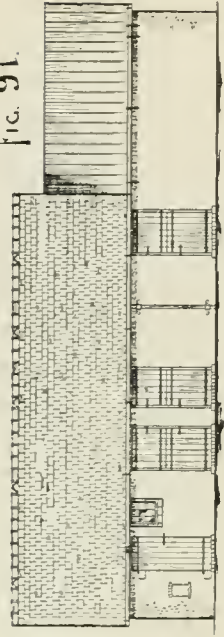


FIG. 90.



SECTION ON C.C.

FIG. 91.



SOUTH-ELEVATION.

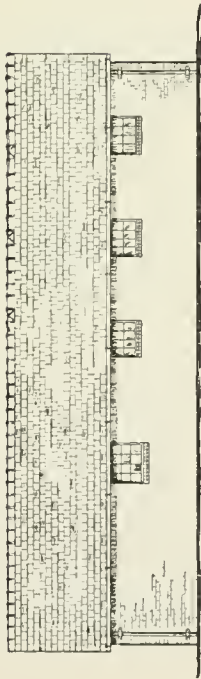
See page 35.

BUILDINGS FOR SMALL HOLDING

35 TO 45 ACRES

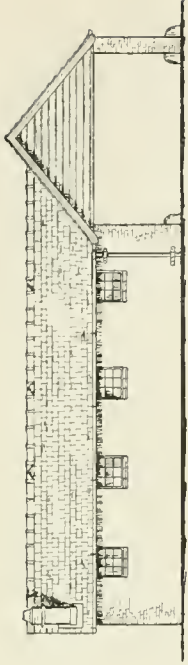
Cost as per Schedule of Prices L 398-0-7

FIG. 92.

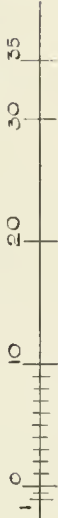


WEST - ELEVATION

FIG. 94

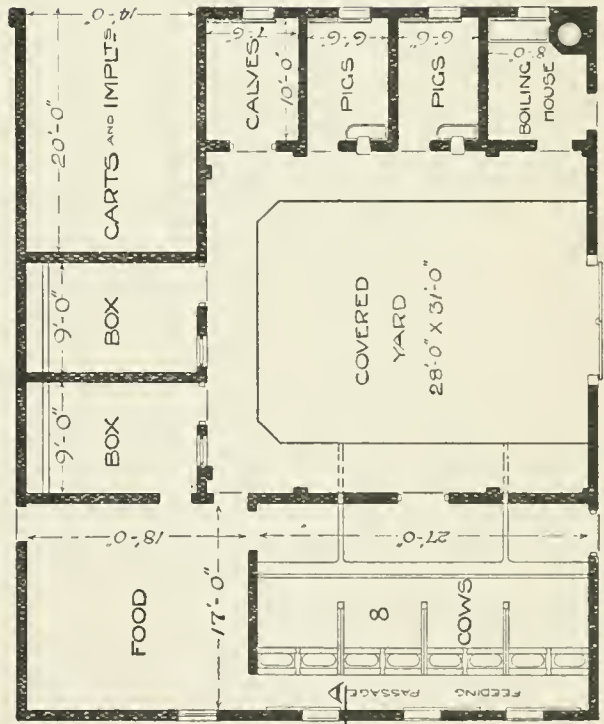


EAST - ELEVATION



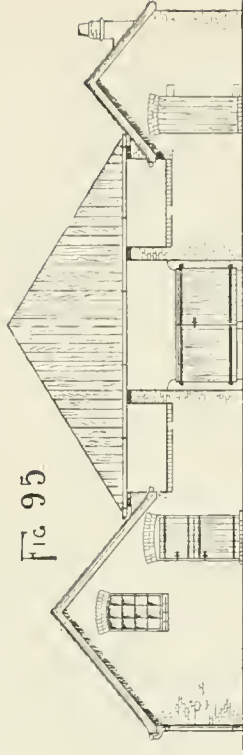
SCALE OF FEET

FIG. 93



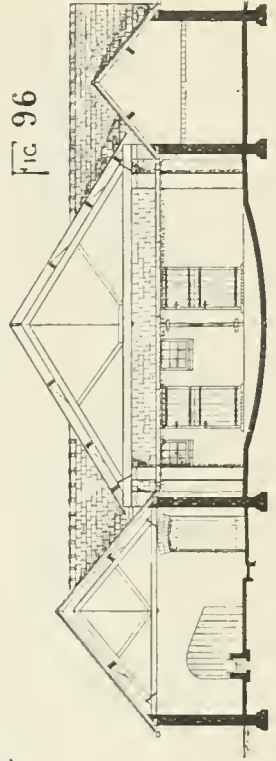
PLAN.

FIG. 95



SOUTH - ELEVATION.

FIG. 96

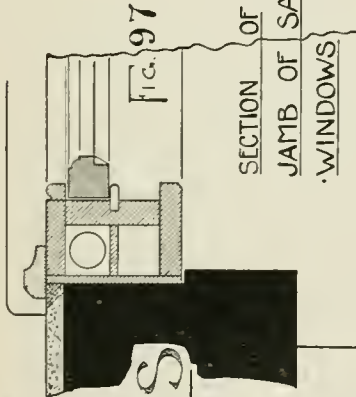


SECTION - A - A.

See page 36.

DETAILS FOR COTTAGES

INCHES 0 12 18



SECTION OF QUARRY FLOORS



FIG. 98

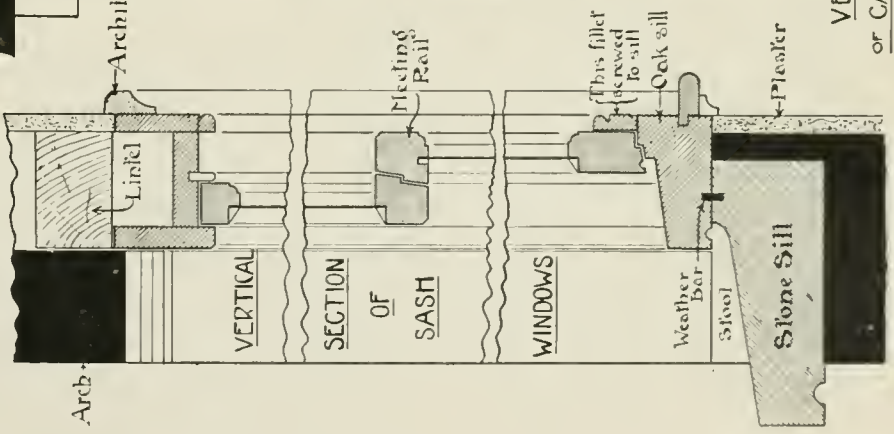


FIG. 99

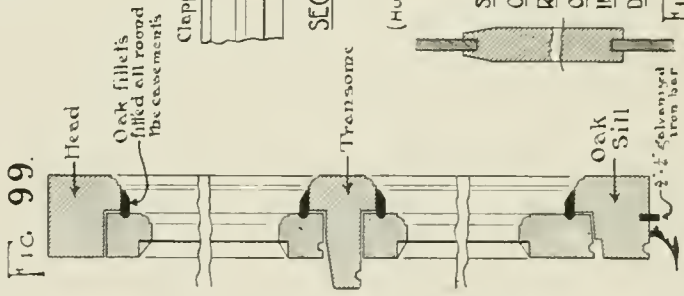


FIG. 100

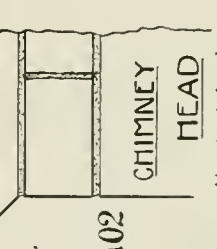


FIG. 102

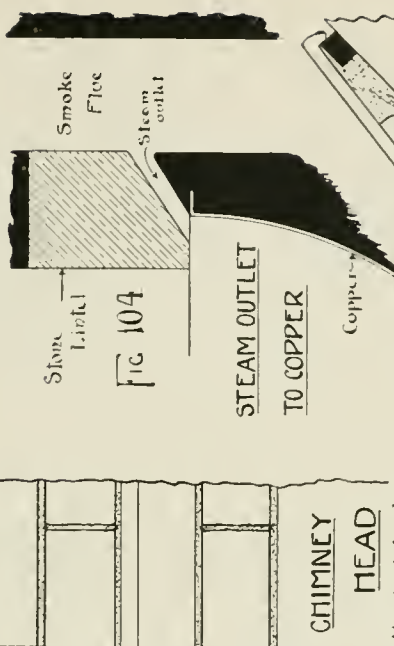


FIG. 104

SECTION OF RAILS OF INTERNAL DOORS.

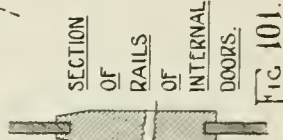


FIG. 101.

FIG. 100.

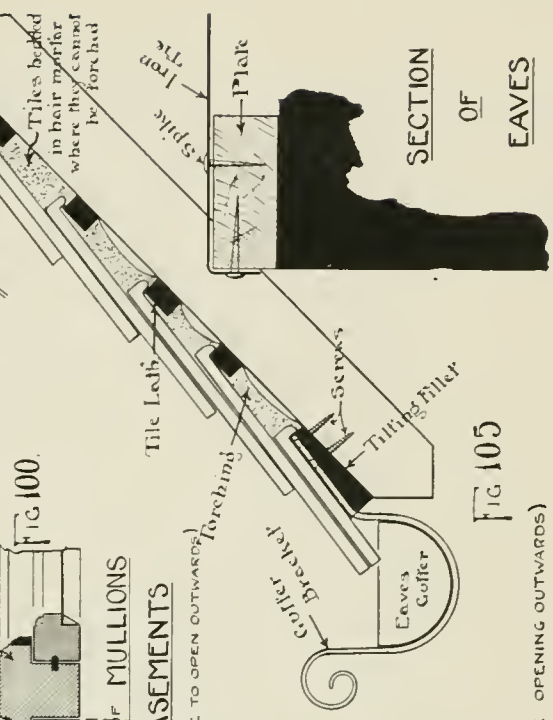
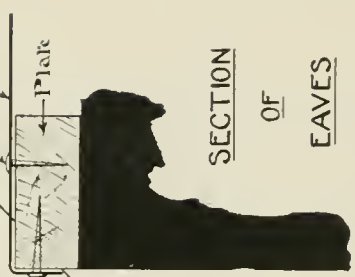


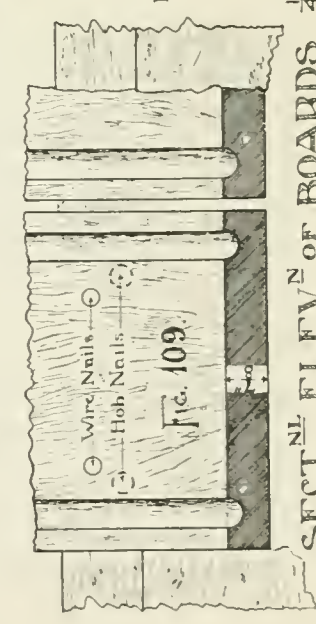
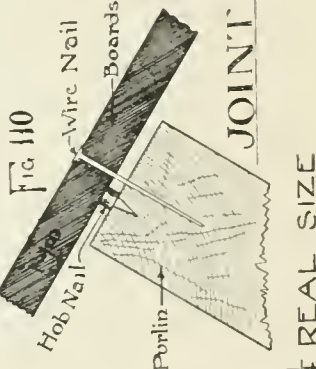
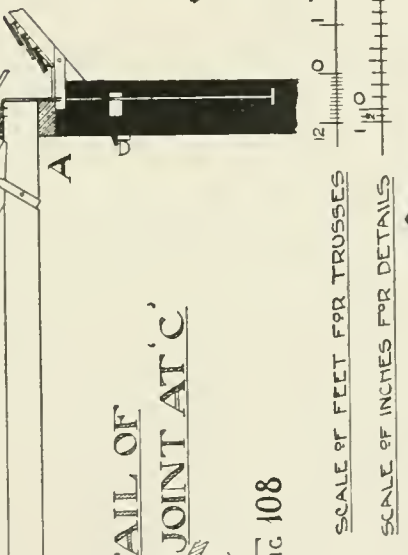
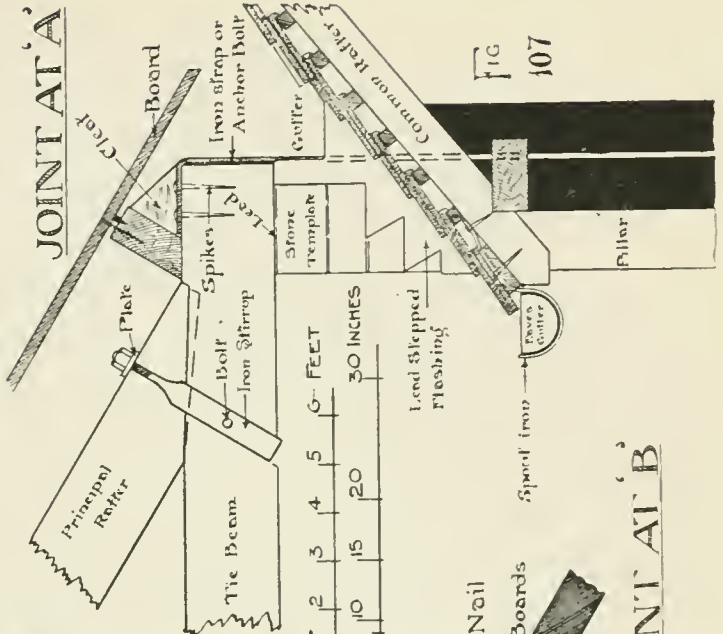
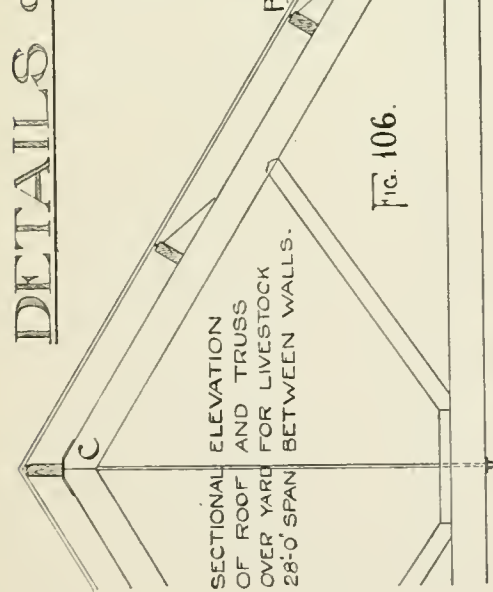
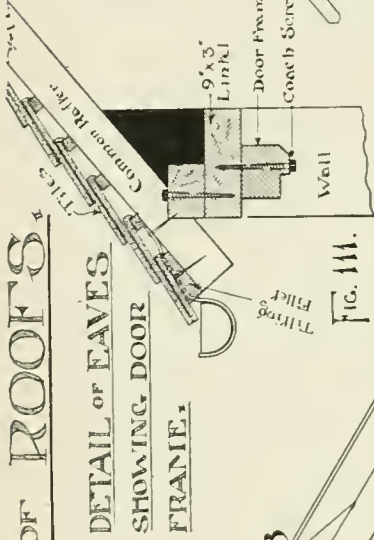
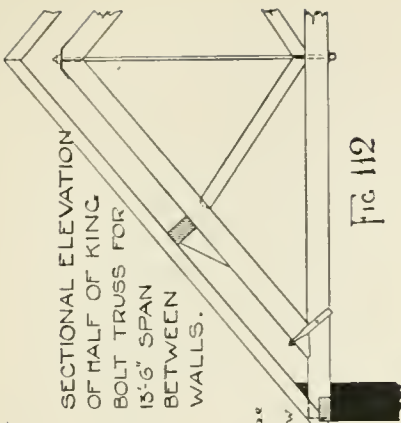
FIG. 105

SECTION OF EAVES



OF CASEMENT WINDOWS (HUNG AT SIDE OPENING OUTWARDS)

DETAILS OF ROOFS



SCALE OF FEET FOR TRUSSES
SCALE OF INCHES FOR DETAILS

BUILDINGS

DETAILS FOR

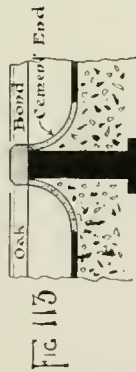


FIG. 113

SECTION OF ENDS OF MANGERS

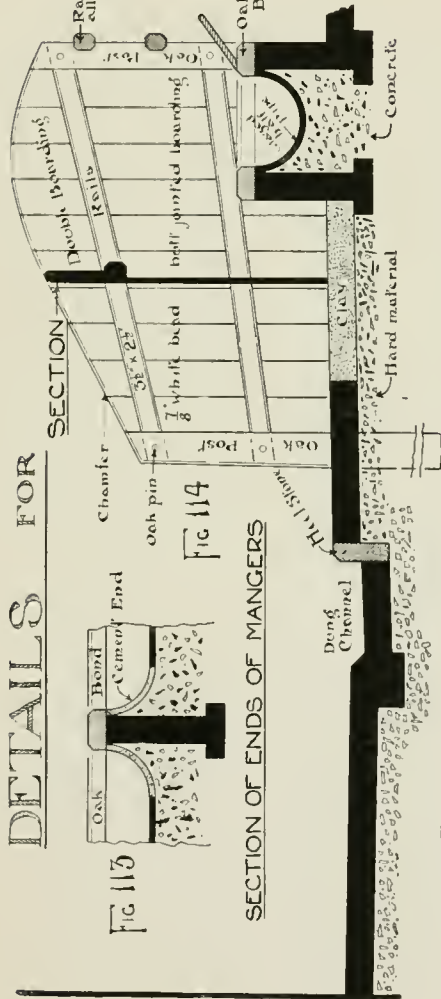


FIG. 114

WINDOWS FOR BOXES.



FIG. 124

ELEVATION

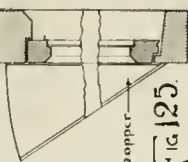


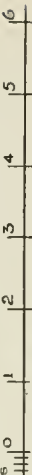
FIG. 125

SECTION

SCALE OF INCHES FOR LARGE SECTIONS



SCALE OF FEET FOR ELEVATIONS



SECTIONAL ELEV^N OF COWSTALLS

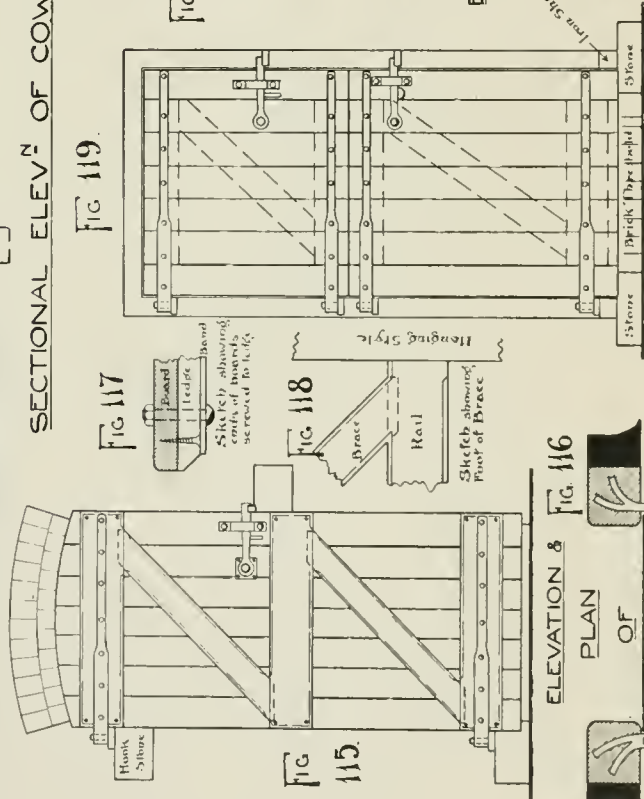


FIG. 115

FIG. 117

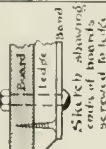
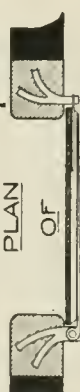


FIG. 118



ELEVATION & PLAN OF



INTERNAL DOORS

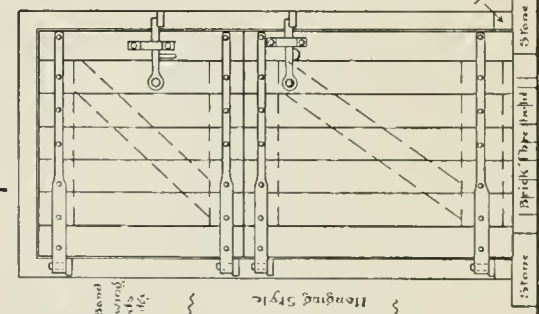


FIG. 119

COWSHED DOORS

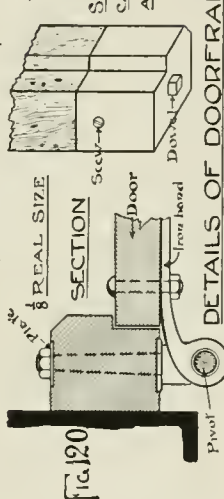


FIG. 120

1/8\"/>

SECTION

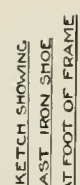


FIG. 121

DETAILS OF DOORFRAMES

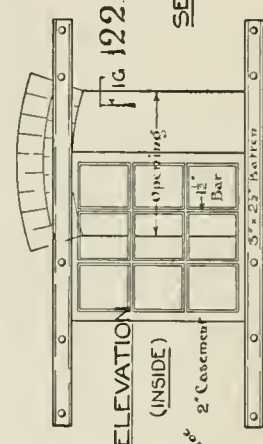


FIG. 122

SECTION

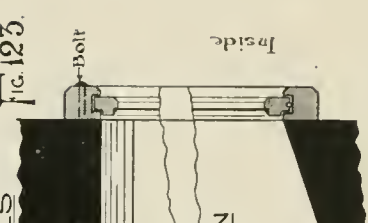


FIG. 123

SLIDING WINDOW

See pages 49-51.

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MODERN HOMESTEADS

A PRACTICAL AND ILLUSTRATED TREATISE ON THE DESIGNING
OF FARM BUILDINGS, FARMHOUSES AND COTTAGES FOR
FARM LABOURERS, FOR ALL CLASSES AND SIZES
OF HOLDINGS FROM 300 TO 3 ACRES.

BY

SAMUEL TAYLOR, F.S.I.

*(Government Medallist in the Science and Practice of Agriculture and the Science of Hygiene,
and awarded Medal of Merit by the British Dairy Farmers' Association
for designs for Homesteads).*

MODERN HOMESTEADS

Is a work intended to be a comprehensive and practical treatise on the erection, maintenance, and restoration of the necessary buildings of landed estates, and is especially designed for the use of those interested in estate works, including landowners, land agents, clerks of works and architects, and builders engaged on estate equipment; but it will also be found of great service to students in Agricultural Colleges or preparing for the land agency branch of the examinations of the Surveyors' Institution.

The following summary of contents will give some idea of the scope of the work:—

DEFECTIVE PRESENT DAY HOMESTEADS.
CLASSIFICATION OF FARMS.
PRINCIPLES OF DESIGN.
HOMESTEADS FOR ARABLE, GRASS, AND MIXED FARMS.
COMPONENT PARTS OF HOMESTEADS.
LIGHTING, VENTILATION, AND WATER SUPPLY.
DETACHED BUILDINGS.
CONSTRUCTIONAL DETAILS.
COVERED YARDS.
RE-MODELLING AND RESTORATION OF OLD HOMESTEADS.
FARMHOUSES AND DAIRIES.
SMALL HOLDINGS.
FARM LABOURERS' COTTAGES.

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MODERN HOMESTEADS

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